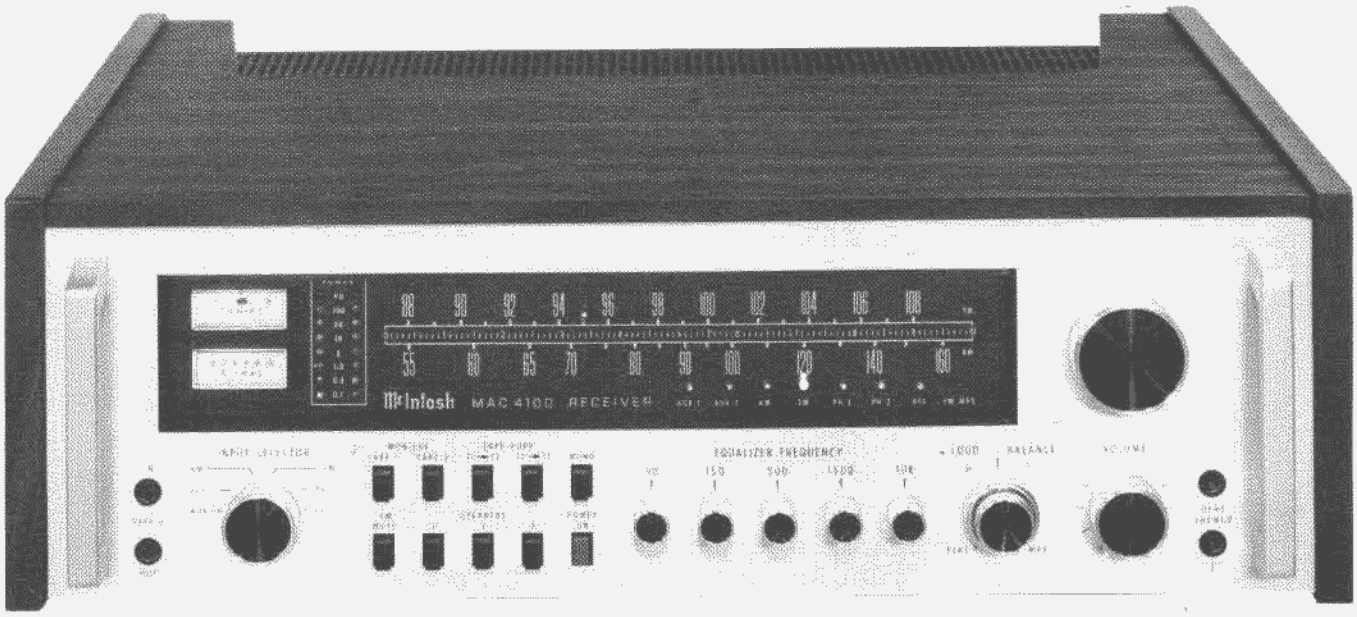
McIntosh

MAC4100

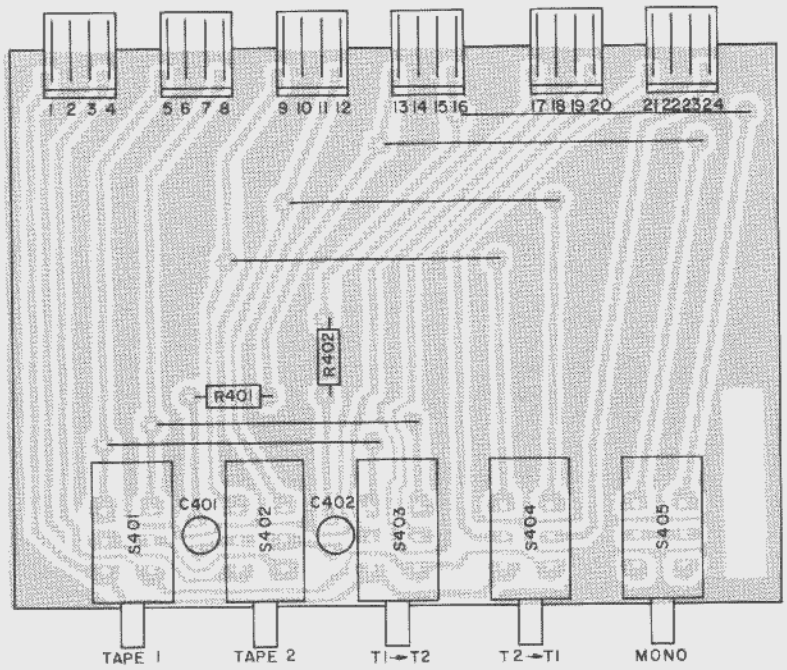
AM/FM RECEIVER



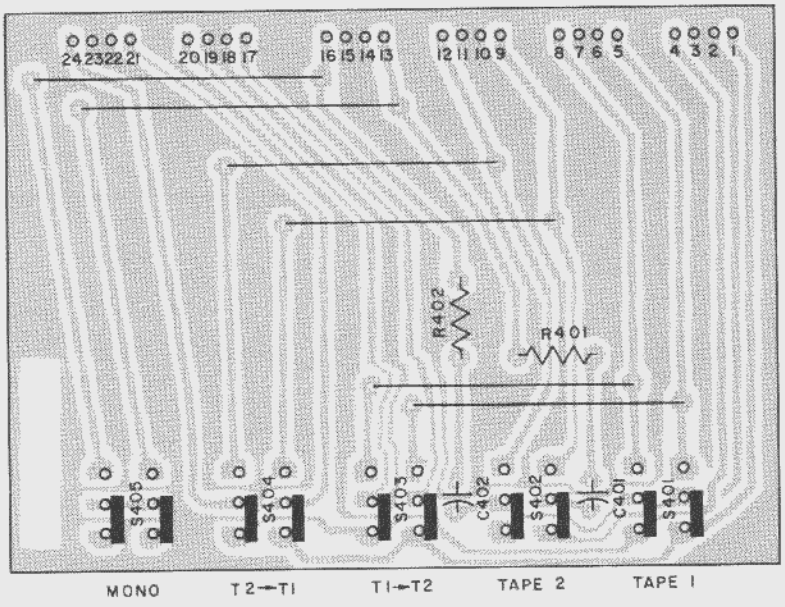
SERVICE INFORMATION

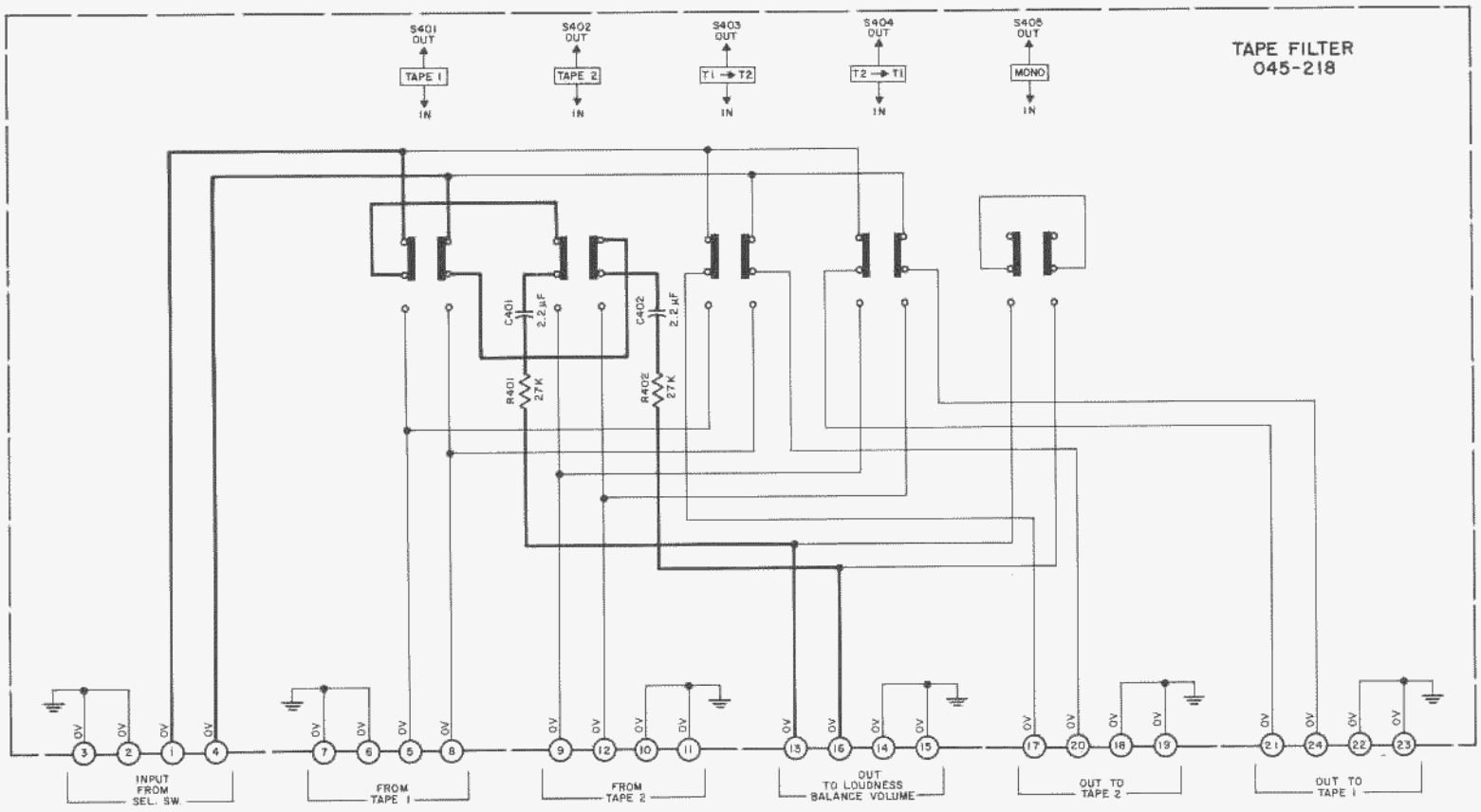
SERIAL NO. BY1001 AND ABOVE

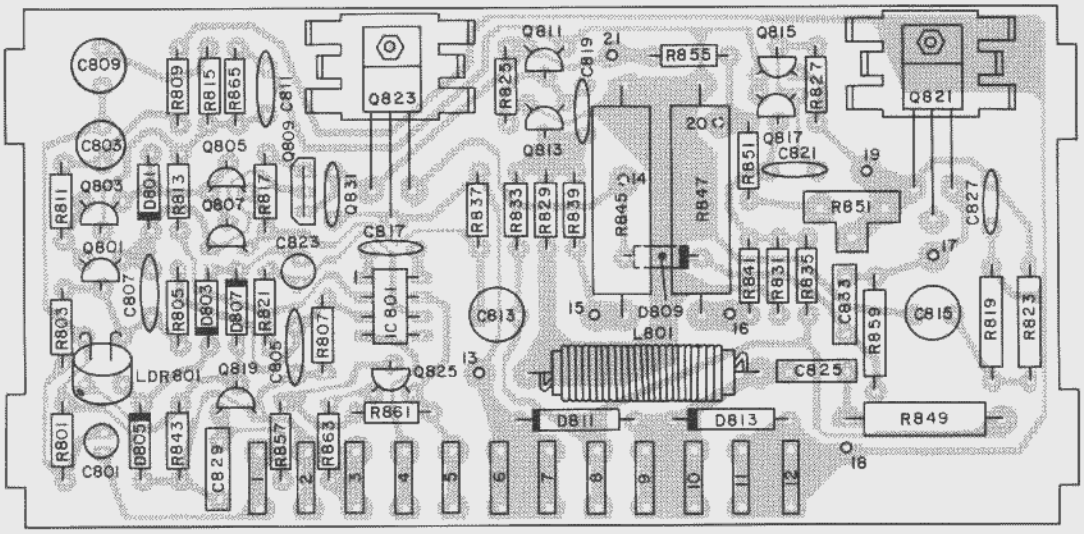
039 044



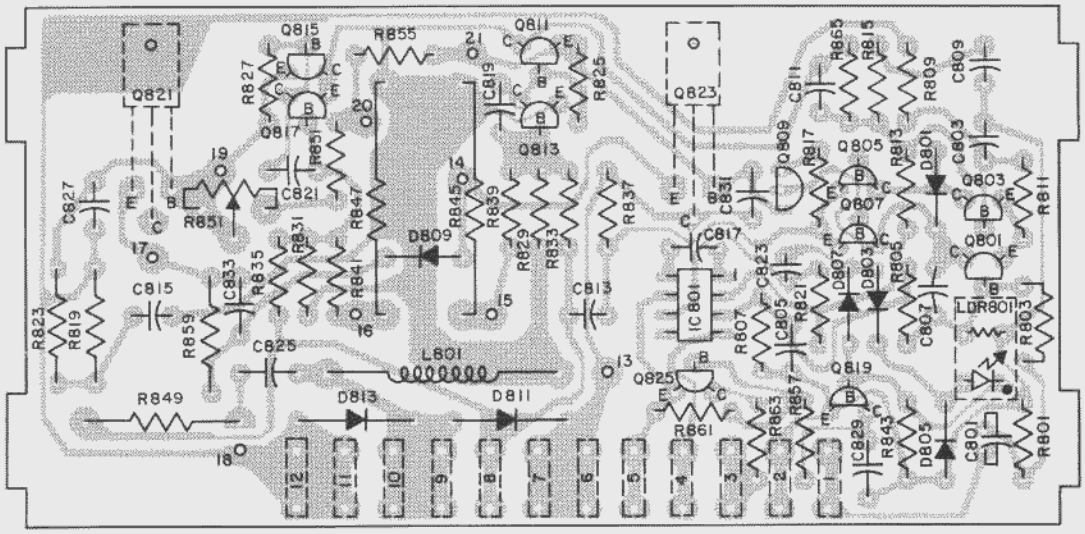
TAPE FILTER PC BOARD
045218

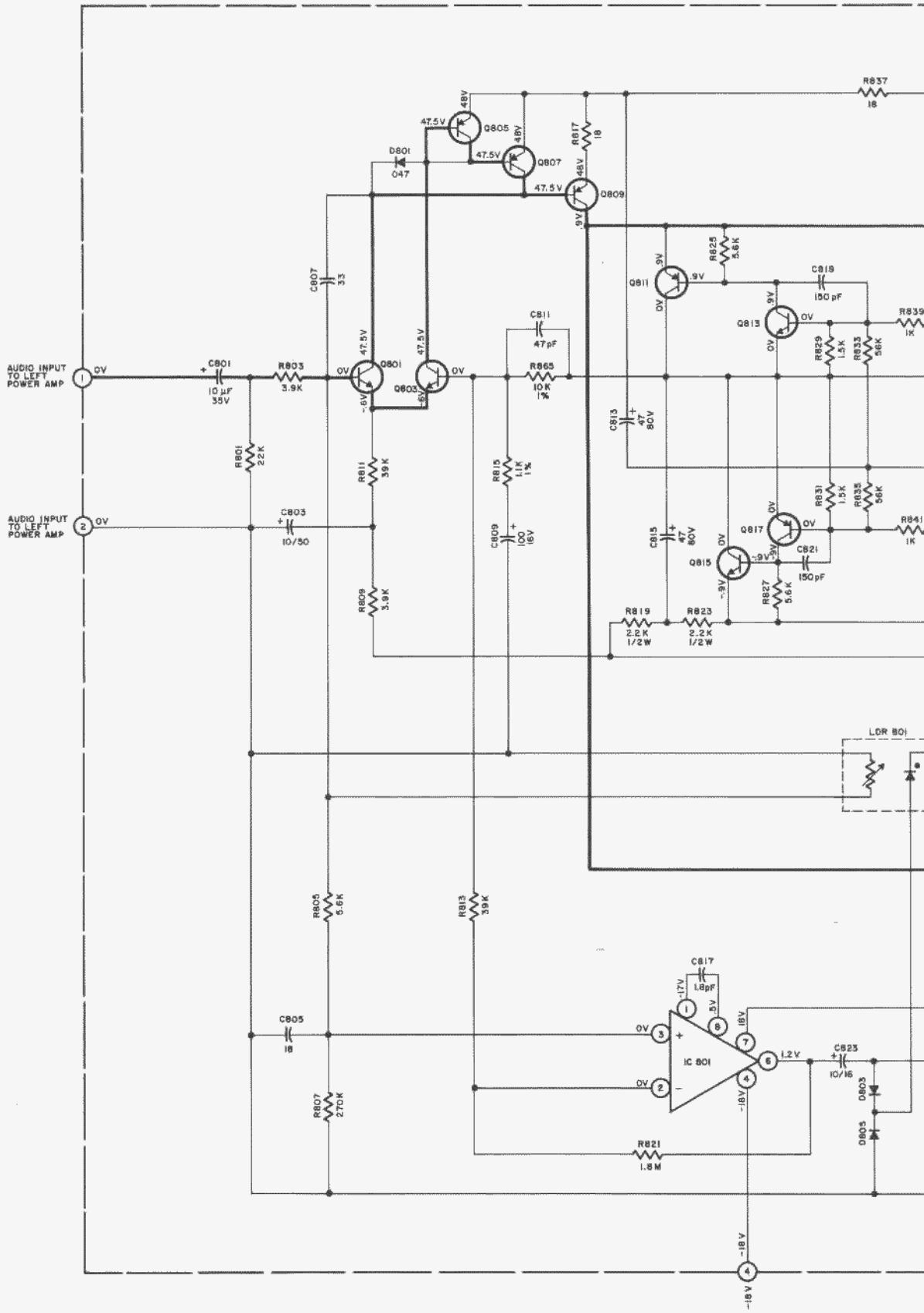


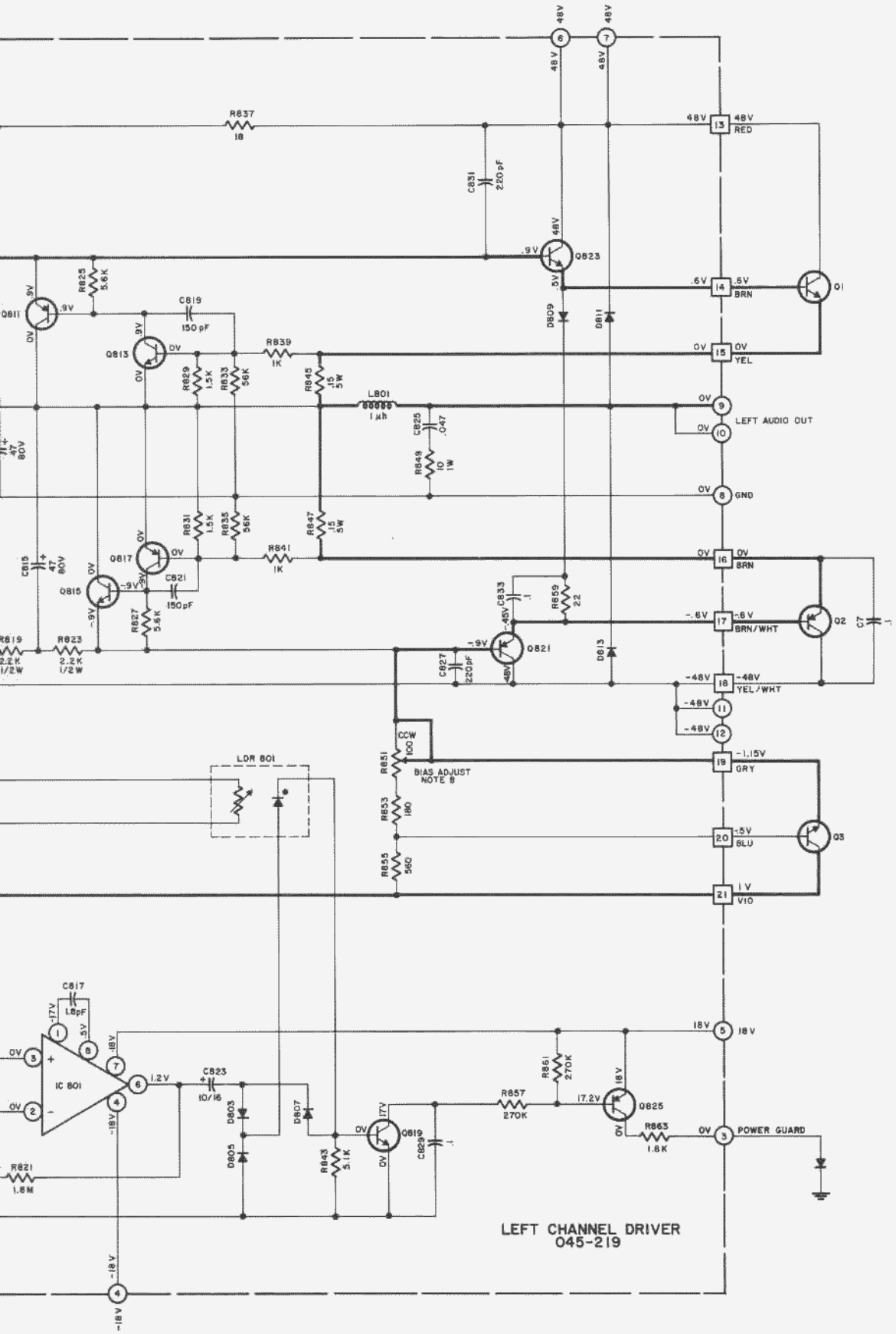

TAPE FILTER
045-218
S401 OUT
TAPE 1
IN
S402 OUT
TAPE 2
IN
S403 OUT
T1 → T2
IN
S404 OUT
T2 → T1
IN
S405 OUT
MONO
IN
C401 2.2 µF
C402 2.2 µF
R401 27K
R402 27K
0V
3
2
1
4
7
6
5
8
9
12
10
11
13
16
14
15
17
20
18
19
21
24
22
23
INPUT FROM SEL. SW.
FROM TAPE 1
FROM TAPE 2
OUT TO LOUDNESS BALANCE VOLUME
OUT TO TAPE 2
OUT TO TAPE 1

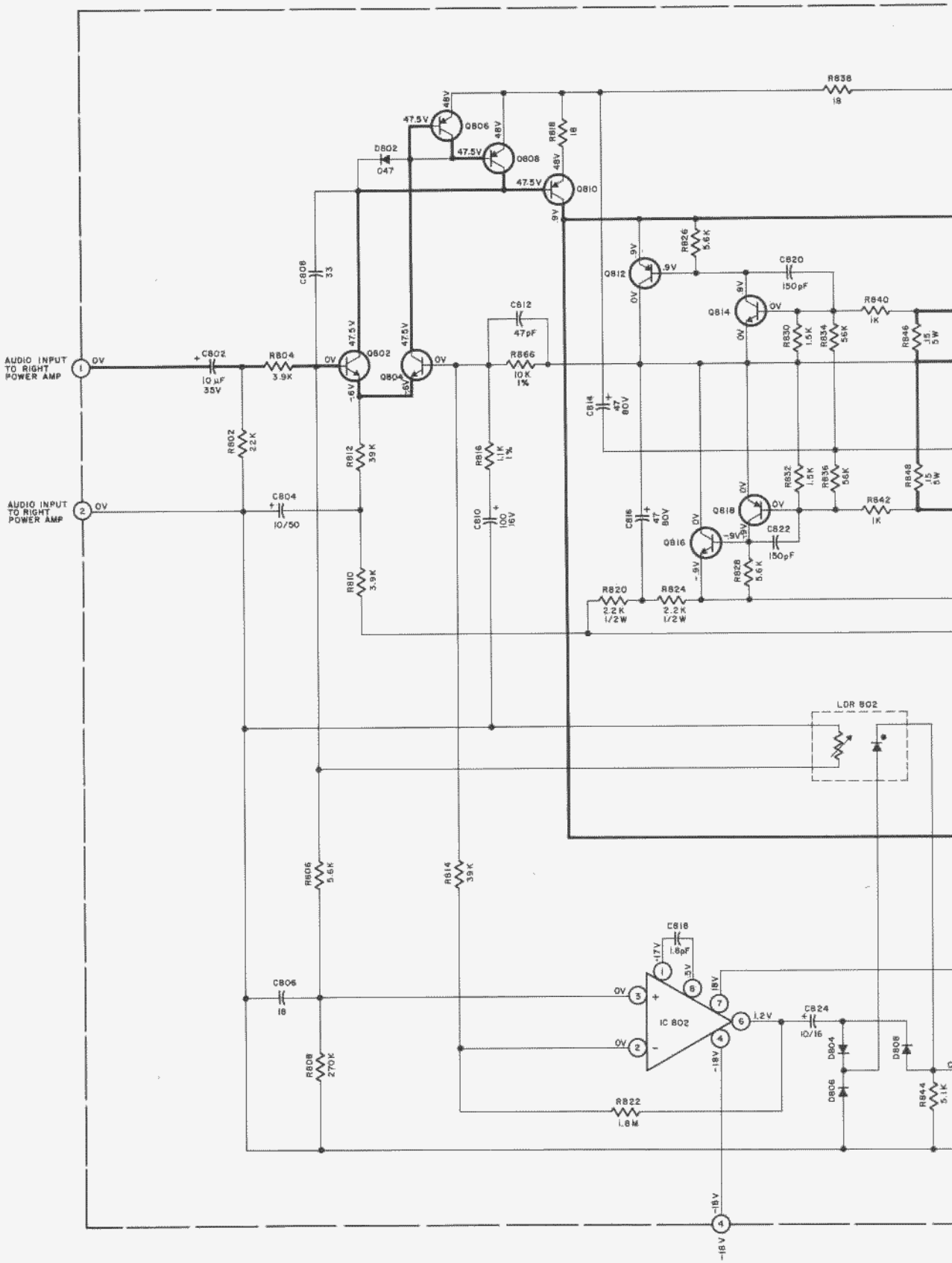


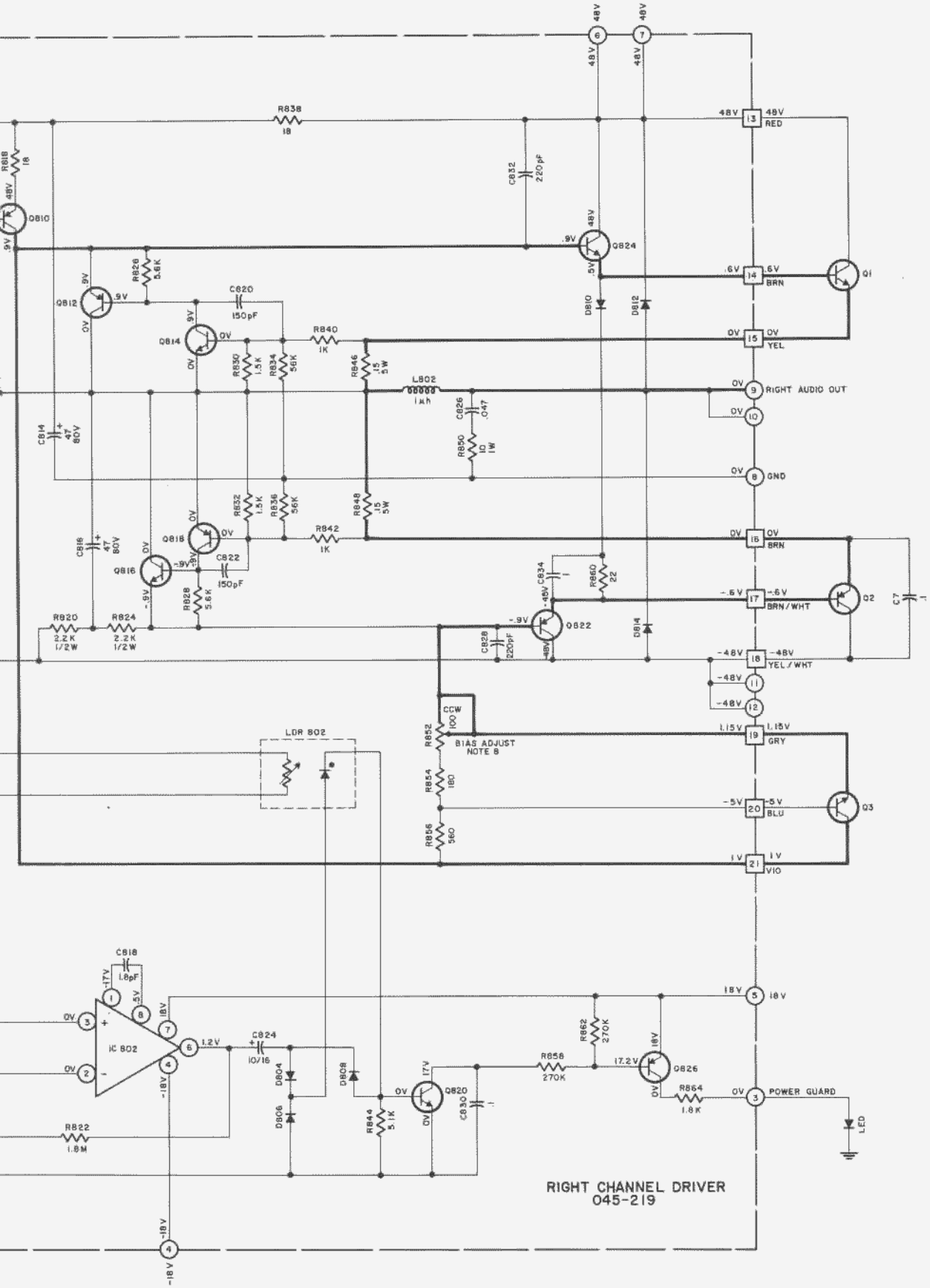
LEFT CHANNEL DRIVER
045219

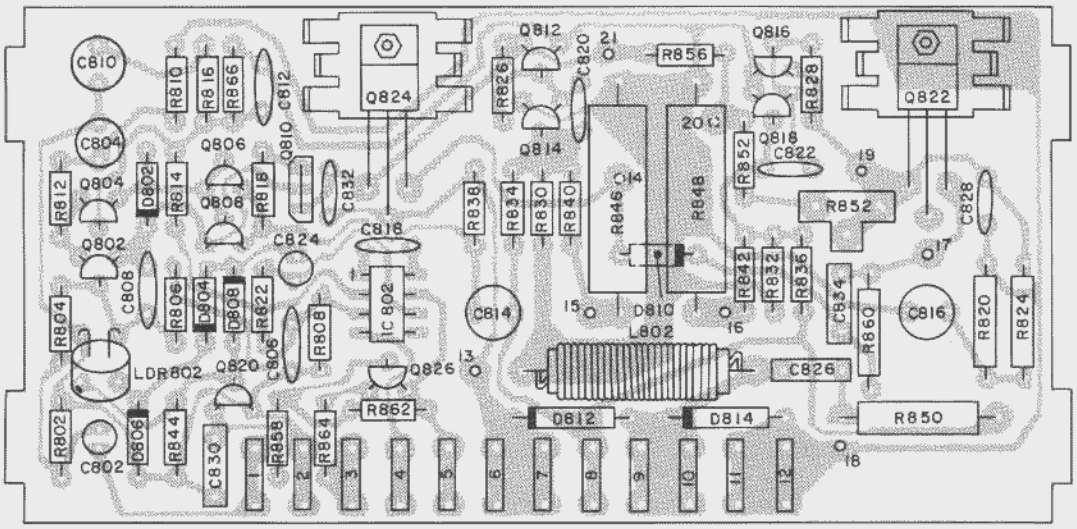



AUDIO INPUT TO LEFT POWER AMP
AUDIO INPUT TO LEFT POWER AMP
C801 10 µF 35V
R803 3.9K
C803 1/50
R801 22K
R811 39K
R809 3.9K
C807 33
D801 047
Q801
Q803
C811 47pF
R865 10K 1%
C809 100 16V
R815 1.1K 1%
Q805
Q807
Q809
R817 18
R837 18
R825 5.6K
Q811
C819 150 pF
Q813
R829 1.5K
R833 56K
R839 1K
C813 47 80V
R831 1.5K
R835 56K
R841 1K
C815 47 80V
Q817
Q815
C821 150 pF
R827 5.6K
R819 2.2K 1/2W
R823 2.2K 1/2W
LDR 801
R805 5.6K
R813 39K
C817 1.8pF
C805 18
R807 270K
IC 801
C823 10/16
D803
D805
R821 1.8M
-18V

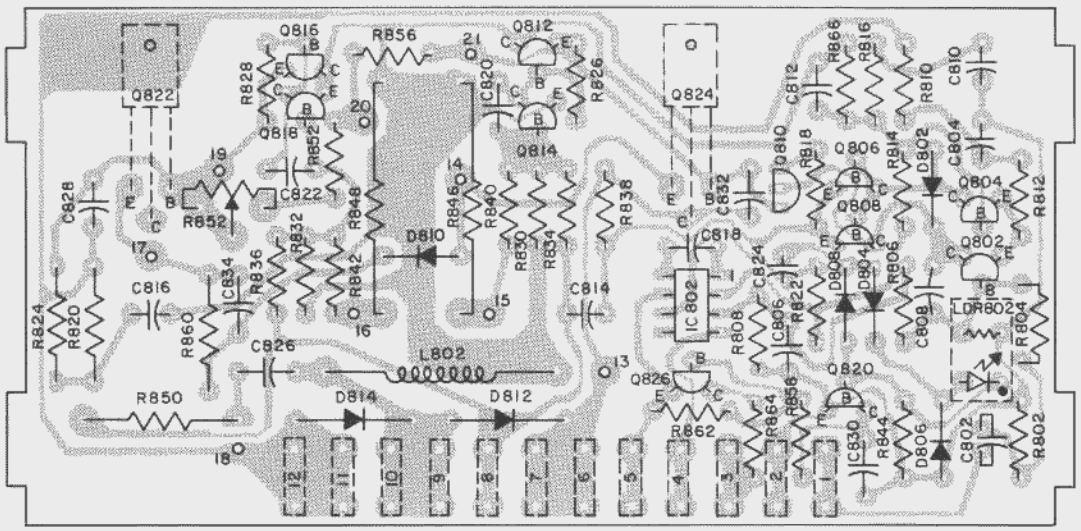

R837
18
C831
220 pF
48V
Q823
.9V
.5V
D809
D811
13
RED
14
BRN
Q1
Q811
R825
5.6K
C819
150 pF
Q813
R829
1.5K
R833
56K
R839
1K
R845
15
5W
15
YEL
L801
1 µh
C825
.047
R849
10
1W
9
LEFT AUDIO OUT
10
8
GND
R831
1.5K
R835
56K
R847
15
5W
R841
1K
16
BRN
Q817
Q815
C821
150pF
R827
5.6K
C833
.1
R659
2.2
17
BRN/WHT
Q2
C7
.1
R819
2.2K
1/2W
R823
2.2K
1/2W
Q821
C827
220pF
D813
18
YEL/WHT
11
12
LDR 801
CCW
100
R851
BIAS ADJUST
NOTE 8
19
GRY
R853
180
20
BLU
Q3
R855
560
21
V10
C817
1.8pF
IC 801
C823
10/16
D803
D805
D807
R843
5.1K
Q819
C829
.1
R857
270K
R861
270K
Q825
R863
1.8K
POWER GUARD
R821
1.8M
LEFT CHANNEL DRIVER
045-219

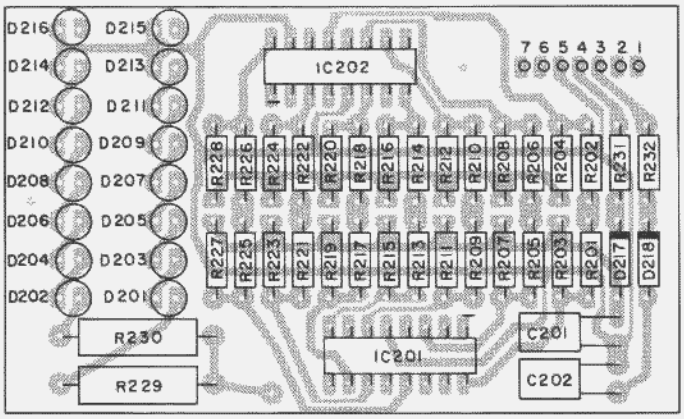

AUDIO INPUT TO RIGHT POWER AMP
AUDIO INPUT TO RIGHT POWER AMP
Q802
Q804
Q806
Q808
Q810
Q812
Q814
Q816
Q818
D802
047
C802
10 µF 35V
C804
10/50
C806
18
C808
33
C810
100 16V
C812
47pF
C814
47 80V
C816
47 80V
C818
1.8pF
C820
150pF
C822
150pF
C824
10/16
R802
2.2K
R804
3.9K
R806
5.6K
R808
270K
R810
3.9K
R812
39K
R814
39K
R816
1.1K 1%
R818
18
R820
2.2K 1/2W
R822
1.8M
R824
2.2K 1/2W
R826
5.6K
R828
5.6K
R830
1.5K
R832
1.5K
R834
56K
R836
56K
R838
18
R840
1K
R842
1K
R844
5.1K
R846
.15 5W
R848
.15 5W
R866
10K 1%
LDR 802
IC 802
D804
D806
D808
-16 V


R838
18
C832
220pF
Q810
Q824
R826
5.6K
C820
150pF
Q812
Q814
R840
1K
R830
1.5K
R834
56K
R846
15
5W
L802
1 mh
C826
.047
R850
10
1W
C814
47
80V
R832
1.5K
R836
56K
R848
15
5W
Q818
Q816
R842
1K
C822
150pF
R828
5.6K
C834
R860
22
Q822
C828
220pF
R820
2.2K
1/2W
R824
2.2K
1/2W
D810
D812
D814
Q1
Q2
Q3
C7
1
48V
13
RED
.6V
14
BRN
0V
15
YEL
9
RIGHT AUDIO OUT
10
8
GND
16
BRN
-.6V
17
BRN/WHT
-48V
18
YEL/WHT
11
12
1.15V
19
GRY
-5V
20
BLU
1V
21
VIO
LDR 802
R852
100
BIAS ADJUST
NOTE 8
R854
180
R856
560
C818
1.8pF
IC 802
C824
10/16
D804
D806
D808
R844
5.1K
Q820
C830
.1
R858
270K
R862
270K
Q826
R864
1.8K
18V
5
POWER GUARD
LED
R822
1.8M
-18V
4
RIGHT CHANNEL DRIVER
045-219

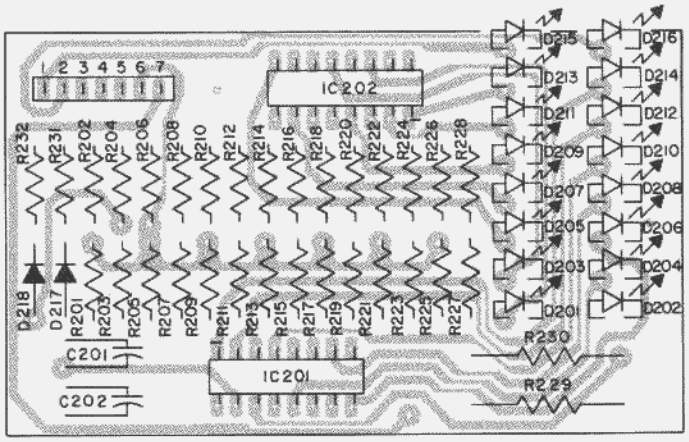


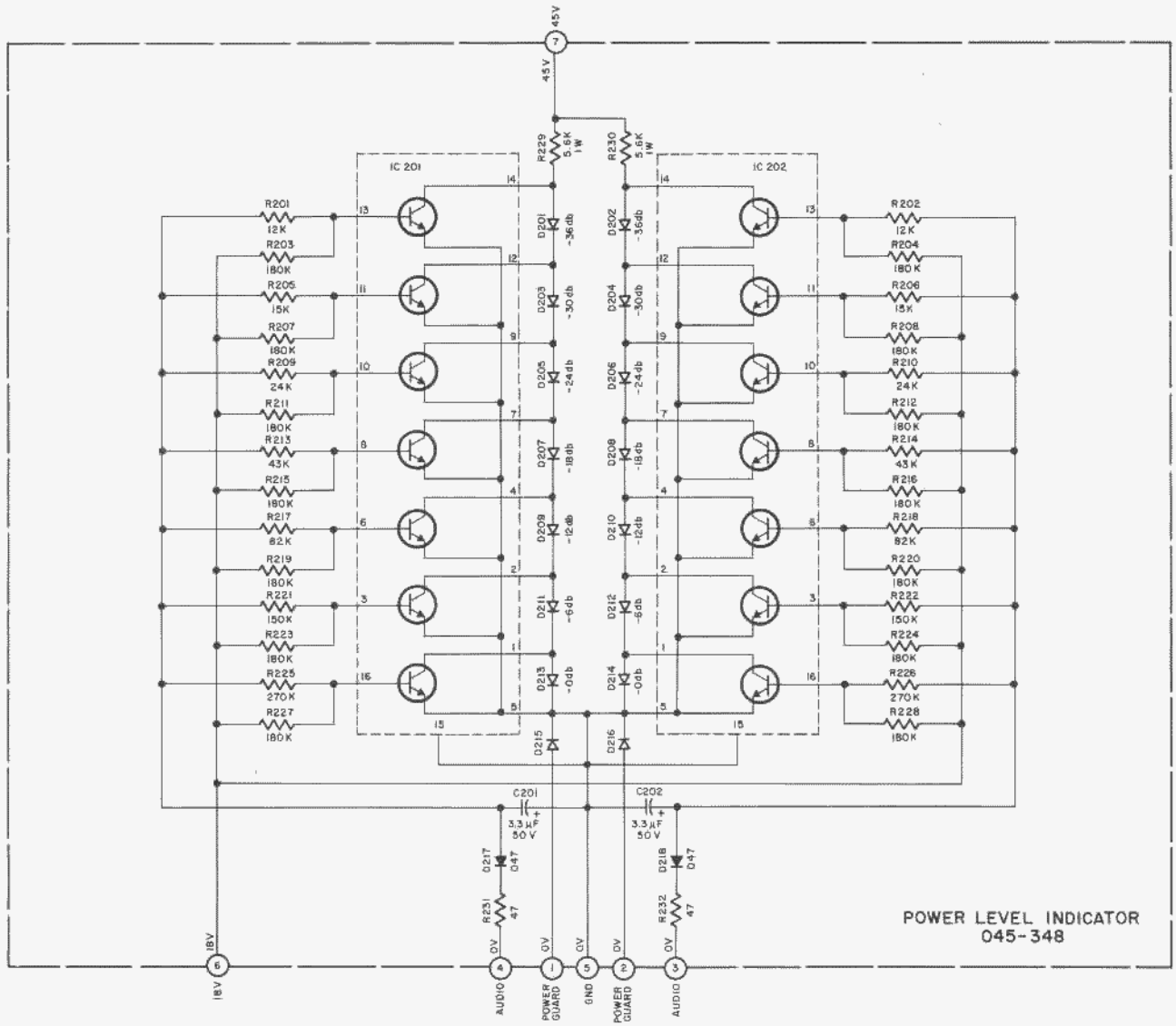
RIGHT CHANNEL DRIVER
045219

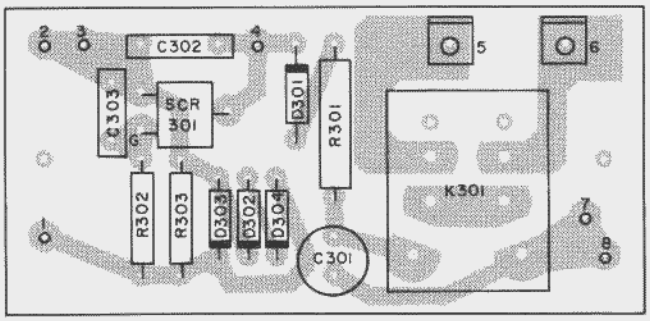




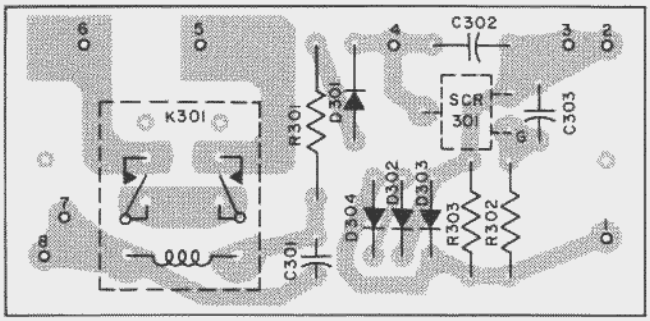
POWER LEVEL INDICATOR
045348

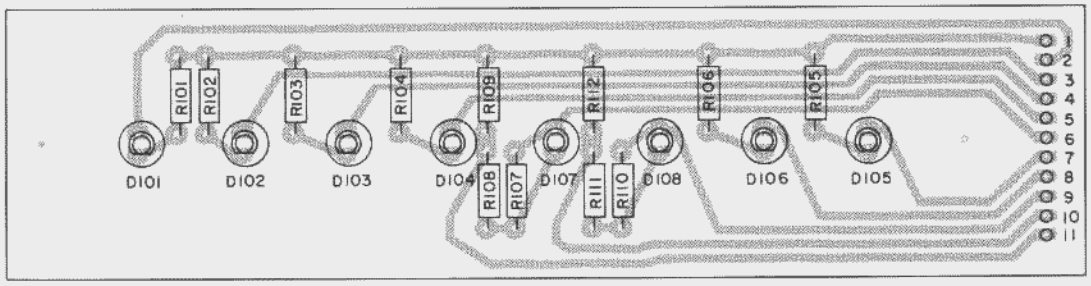



45V
IC 201
IC 202
R229 5.6K 1W
R230 5.6K 1W
R201 12K
R202 12K
R203 180K
R204 180K
R205 15K
R206 15K
R207 180K
R208 180K
R209 24K
R210 24K
R211 180K
R212 180K
R213 43K
R214 43K
R215 180K
R216 180K
R217 82K
R218 82K
R219 180K
R220 180K
R221 150K
R222 150K
R223 180K
R224 180K
R225 270K
R226 270K
R227 180K
R228 180K
D201 -36db
D202 -36db
D203 -30db
D204 -30db
D205 -24db
D206 -24db
D207 -18db
D208 -18db
D209 -12db
D210 -12db
D211 -6db
D212 -6db
D213 -0db
D214 -0db
D215
D216
C201 3.3µF 50V
C202 3.3µF 50V
D217 047
D218 047
R231 47
R232 47
18V
0V
AUDIO
POWER GUARD
GND
POWER GUARD
AUDIO
POWER LEVEL INDICATOR
045-348

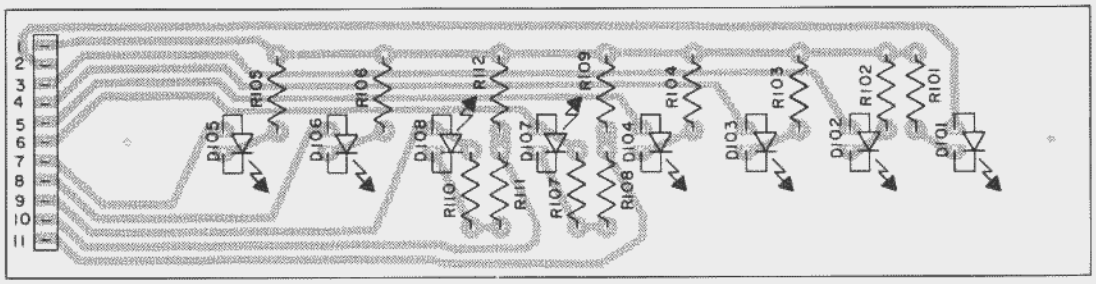


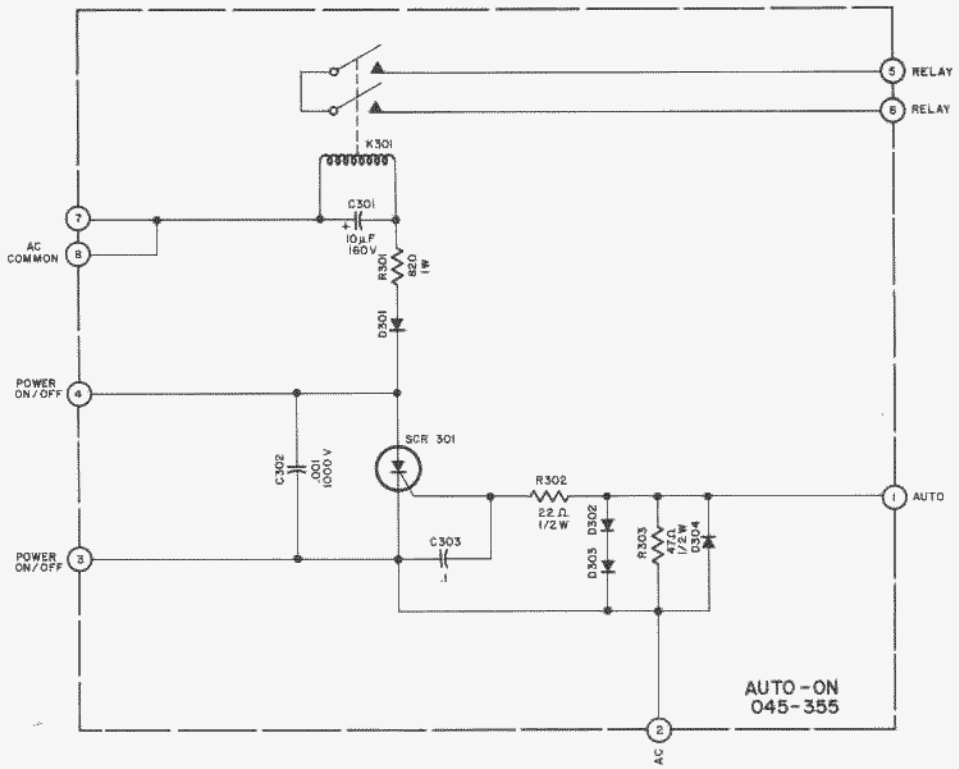
AUTO–ON PC BOARD
045355



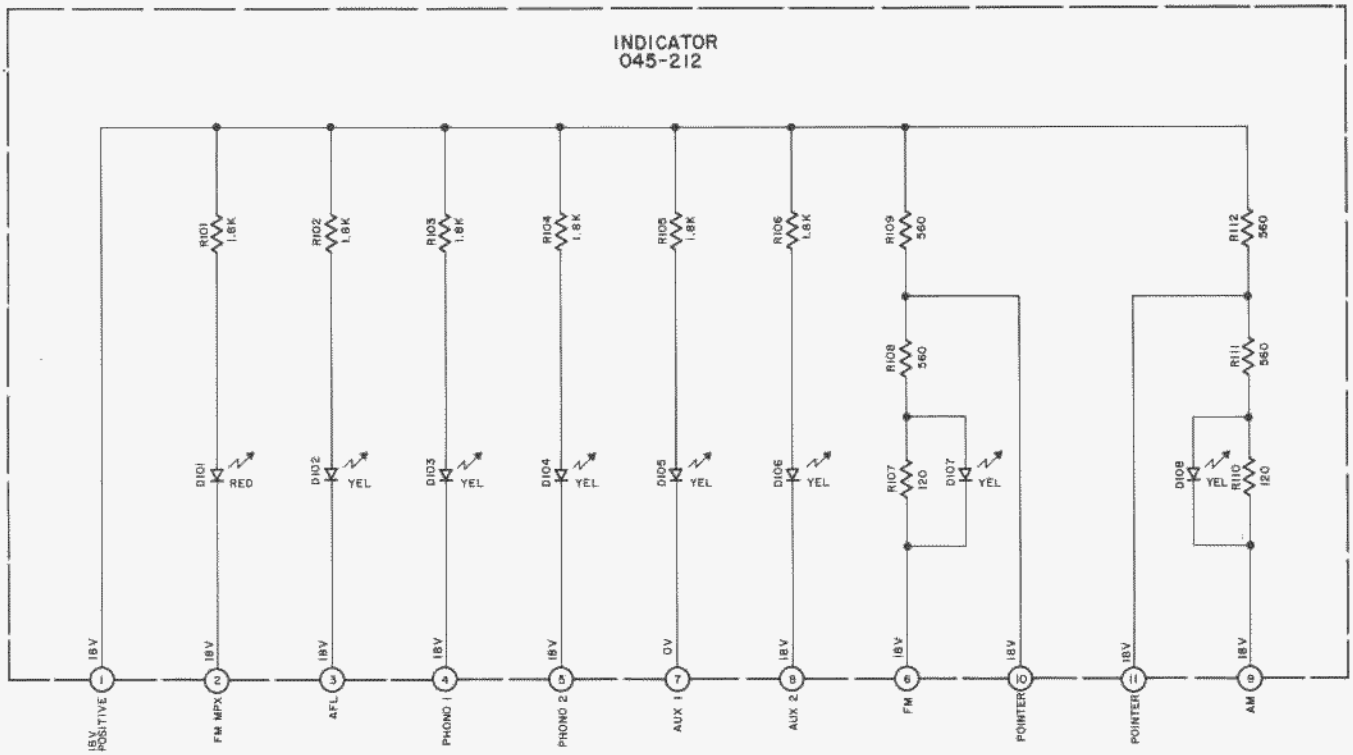


INDICATOR PC BOARD
045212

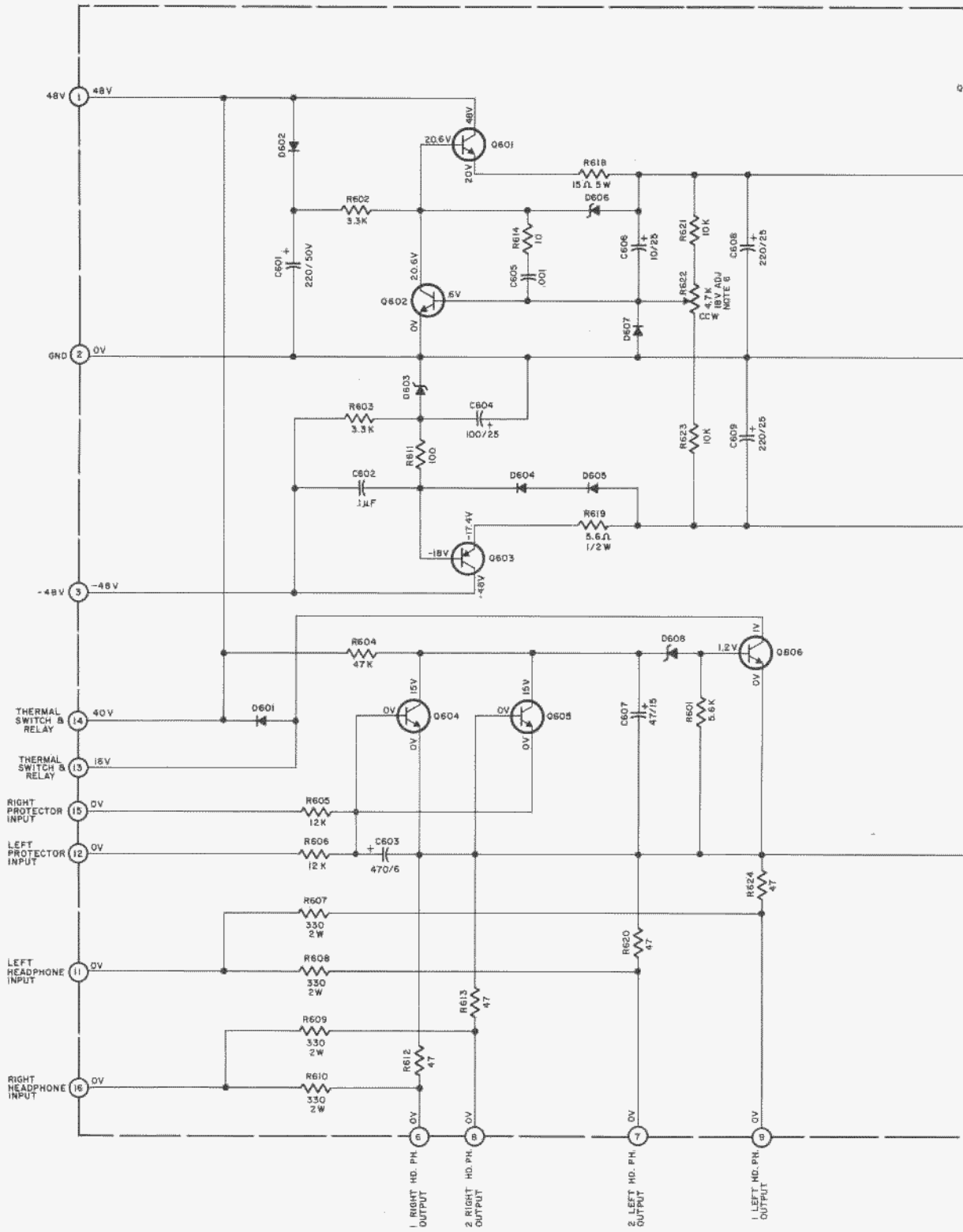


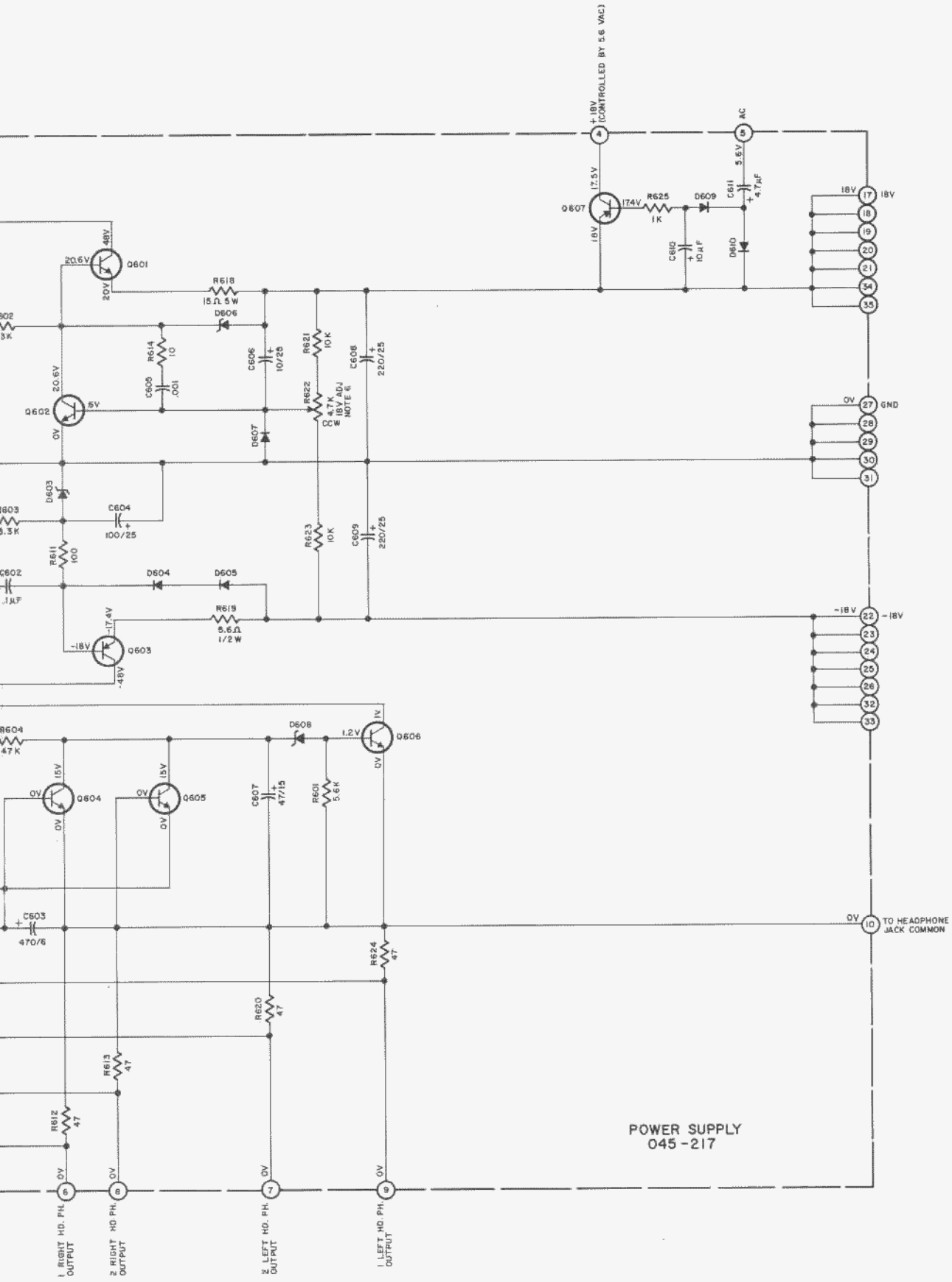


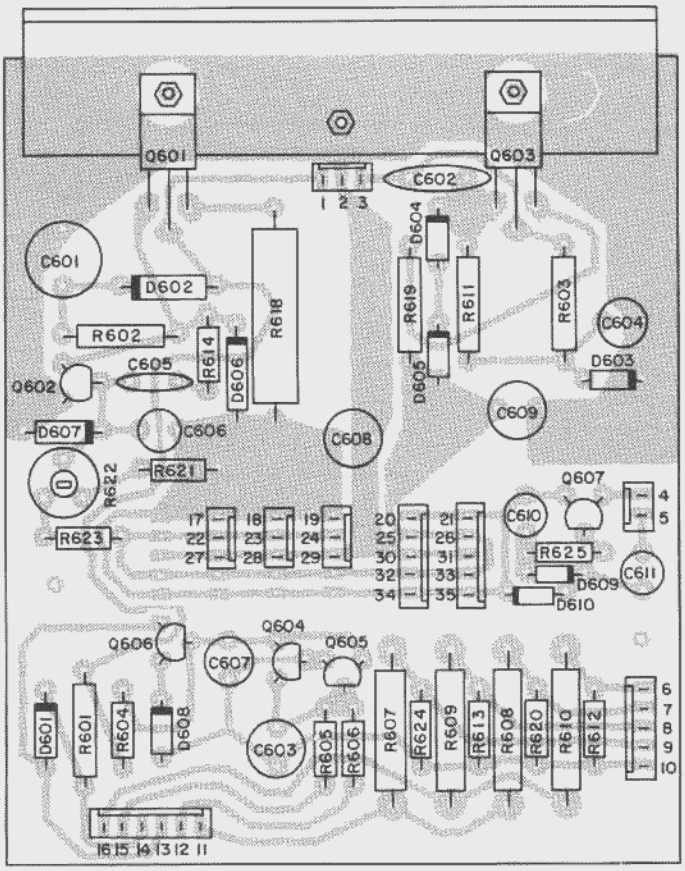
AUTO-ON



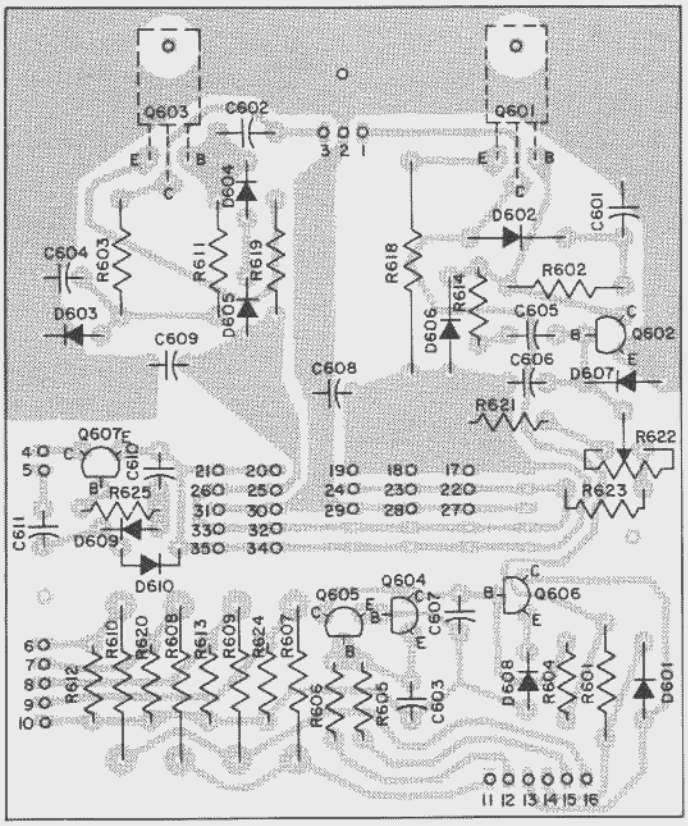
INDICATOR


48V
GND
-48V
THERMAL SWITCH & RELAY
THERMAL SWITCH & RELAY
RIGHT PROTECTOR INPUT
LEFT PROTECTOR INPUT
LEFT HEADPHONE INPUT
RIGHT HEADPHONE INPUT
1 RIGHT HD. PH. OUTPUT
2 RIGHT HD. PH. OUTPUT
2 LEFT HD. PH. OUTPUT
1 LEFT HD. PH. OUTPUT
Q601
Q602
Q603
Q604
Q605
Q606
D601
D602
D603
D604
D605
D606
D607
D608
R601 5.6K
R602 3.3K
R603 3.3K
R604 47K
R605 12K
R606 12K
R607 330 2W
R608 330 2W
R609 330 2W
R610 330 2W
R611 100
R612 47
R613 47
R614 10
R618 15Ω 5W
R619 5.6Ω 1/2W
R620 47
R621 10K
R622 4.7K 18V ADJ NOTE 6
R623 10K
R624 47
C601 220/50V
C602 1μF
C603 470/6
C604 100/25
C605 .001
C606 10/25
C607 47/15
C608 220/25
C609 220/25

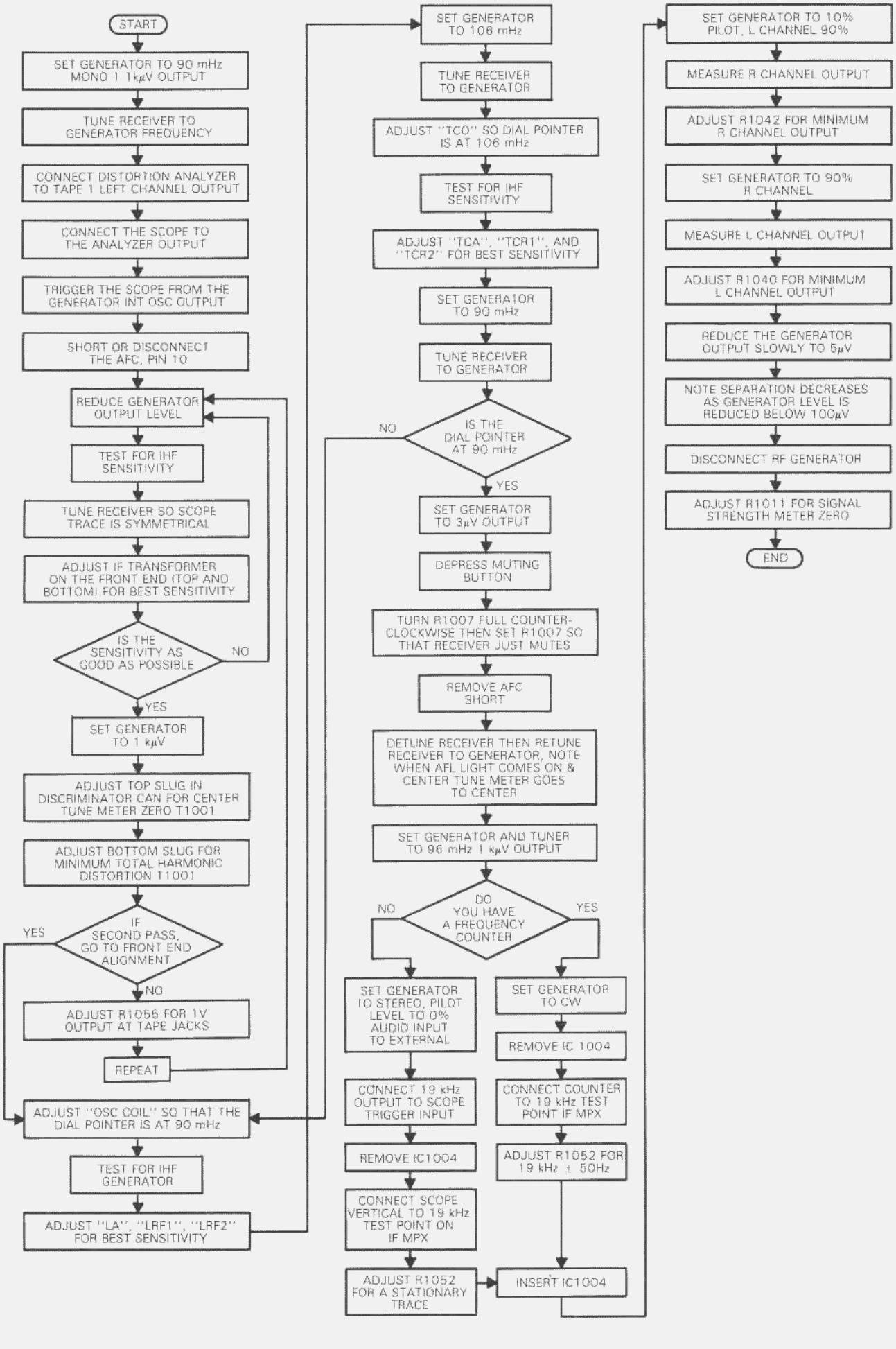

+18V (CONTROLLED BY 5.6 VAC)
AC
Q601
Q602
Q603
Q604
Q605
Q606
Q607
R618
15Ω 5W
R625
1K
R621
10K
R622
4.7K
18V ADJ
NOTE 6
CCW
R623
10K
R624
47
R620
47
R613
47
R612
47
R611
100
R614
10
R601
5.6K
C606
10/25
C608
220/25
C609
220/25
C604
100/25
C607
47/15
C603
470/6
C610
10μF
C611
4.7μF
D606
D607
D608
D609
D610
D603
D604
D605
GND
-18V
TO HEADPHONE JACK COMMON
1 RIGHT HD. PH. OUTPUT
2 RIGHT HD. PH. OUTPUT
2 LEFT HD. PH. OUTPUT
1 LEFT HD. PH. OUTPUT
POWER SUPPLY
045-217



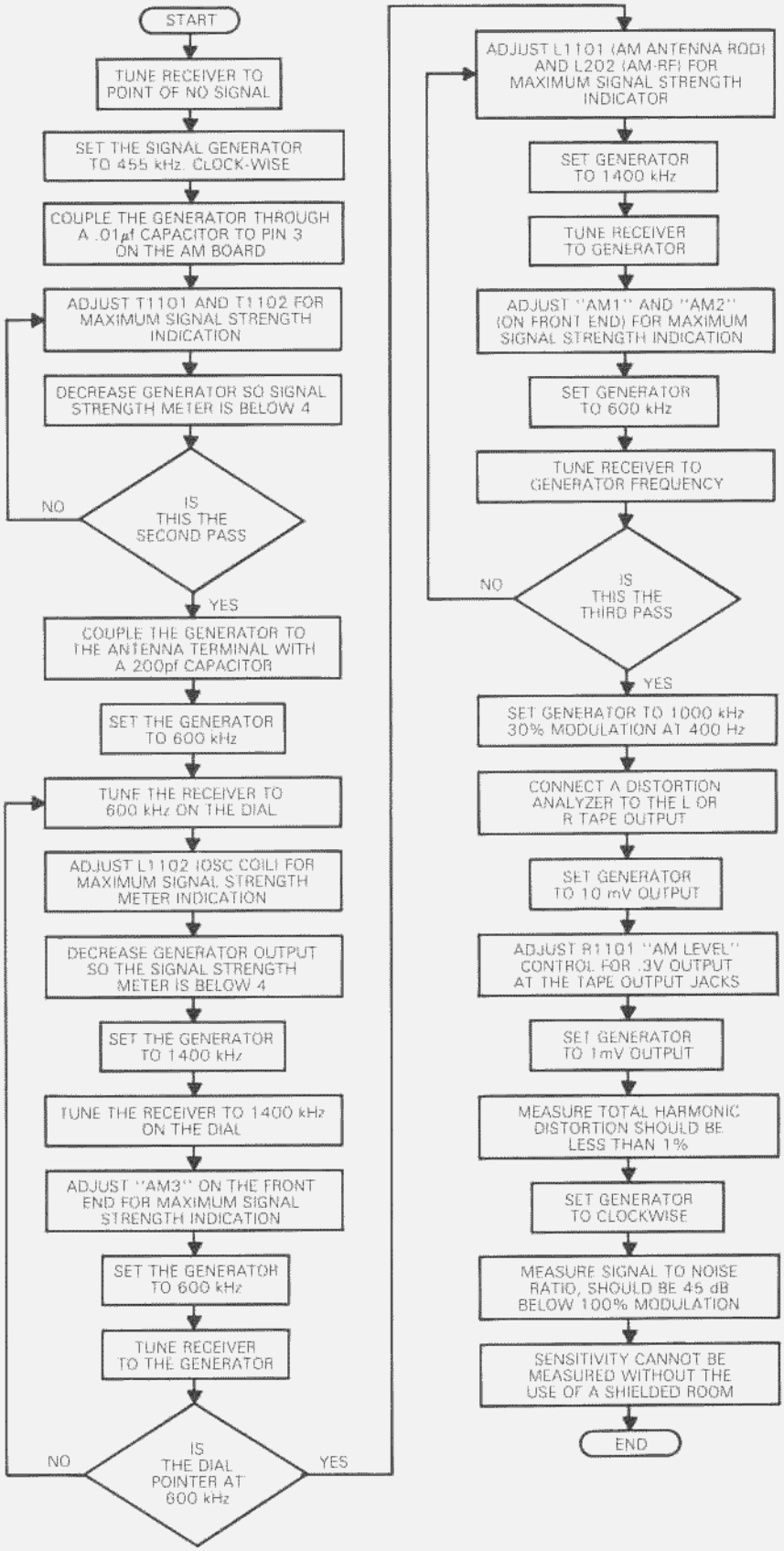
POWER SUPPLY PC BOARD
045217



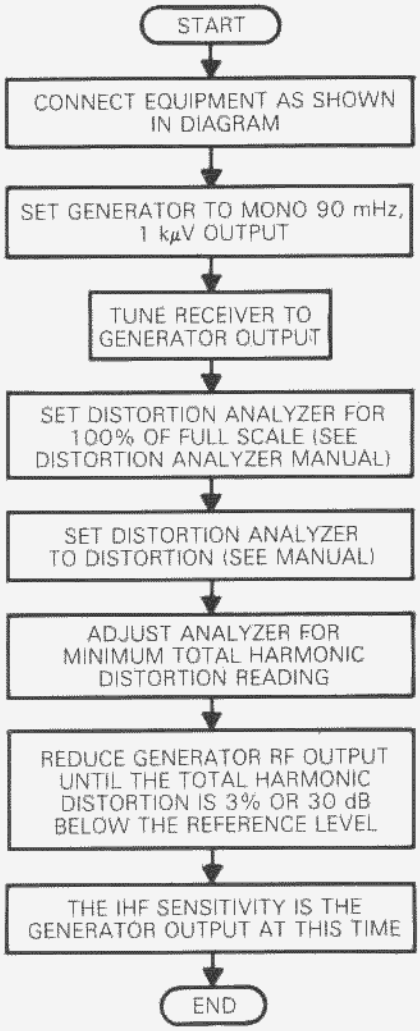
FM ALIGNMENT

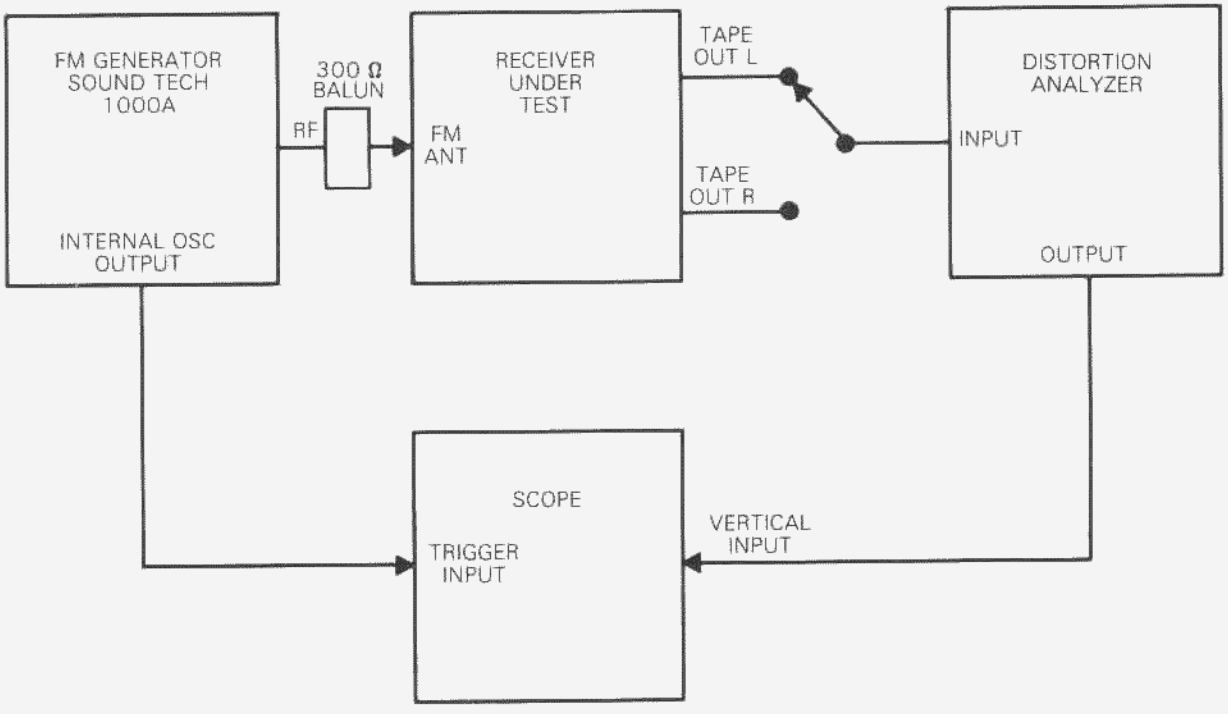

START
SET GENERATOR TO 90 mHz MONO 1 1kμV OUTPUT
TUNE RECEIVER TO GENERATOR FREQUENCY
CONNECT DISTORTION ANALYZER TO TAPE 1 LEFT CHANNEL OUTPUT
CONNECT THE SCOPE TO THE ANALYZER OUTPUT
TRIGGER THE SCOPE FROM THE GENERATOR INT OSC OUTPUT
SHORT OR DISCONNECT THE AFC, PIN 10
REDUCE GENERATOR OUTPUT LEVEL
TEST FOR IHF SENSITIVITY
TUNE RECEIVER SO SCOPE TRACE IS SYMMETRICAL
ADJUST IF TRANSFORMER ON THE FRONT END (TOP AND BOTTOM) FOR BEST SENSITIVITY
IS THE SENSITIVITY AS GOOD AS POSSIBLE
NO
YES
SET GENERATOR TO 1 kμV
ADJUST TOP SLUG IN DISCRIMINATOR CAN FOR CENTER TUNE METER ZERO T1001
ADJUST BOTTOM SLUG FOR MINIMUM TOTAL HARMONIC DISTORTION T1001
IF SECOND PASS, GO TO FRONT END ALIGNMENT
YES
NO
ADJUST R1055 FOR 1V OUTPUT AT TAPE JACKS
REPEAT
ADJUST "OSC COIL" SO THAT THE DIAL POINTER IS AT 90 mHz
TEST FOR IHF GENERATOR
ADJUST "LA", "LRF1", "LRF2" FOR BEST SENSITIVITY
SET GENERATOR TO 106 mHz
TUNE RECEIVER TO GENERATOR
ADJUST "TCO" SO DIAL POINTER IS AT 106 mHz
TEST FOR IHF SENSITIVITY
ADJUST "TCA", "TCR1", AND "TCR2" FOR BEST SENSITIVITY
SET GENERATOR TO 90 mHz
TUNE RECEIVER TO GENERATOR
IS THE DIAL POINTER AT 90 mHz
NO
YES
SET GENERATOR TO 3μV OUTPUT
DEPRESS MUTING BUTTON
TURN R1007 FULL COUNTER-CLOCKWISE THEN SET R1007 SO THAT RECEIVER JUST MUTES
REMOVE AFC SHORT
DETUNE RECEIVER THEN RETUNE RECEIVER TO GENERATOR, NOTE WHEN AFL LIGHT COMES ON & CENTER TUNE METER GOES TO CENTER
SET GENERATOR AND TUNER TO 96 mHz 1 kμV OUTPUT
DO YOU HAVE A FREQUENCY COUNTER
NO
YES
SET GENERATOR TO STEREO, PILOT LEVEL TO 0% AUDIO INPUT TO EXTERNAL
CONNECT 19 kHz OUTPUT TO SCOPE TRIGGER INPUT
REMOVE IC1004
CONNECT SCOPE VERTICAL TO 19 kHz TEST POINT ON IF MPX
ADJUST R1052 FOR A STATIONARY TRACE
SET GENERATOR TO CW
REMOVE IC 1004
CONNECT COUNTER TO 19 kHz TEST POINT IF MPX
ADJUST R1052 FOR 19 kHz ± 50Hz
INSERT IC1004
SET GENERATOR TO 10% PILOT, L CHANNEL 90%
MEASURE R CHANNEL OUTPUT
ADJUST R1042 FOR MINIMUM R CHANNEL OUTPUT
SET GENERATOR TO 90% R CHANNEL
MEASURE L CHANNEL OUTPUT
ADJUST R1040 FOR MINIMUM L CHANNEL OUTPUT
REDUCE THE GENERATOR OUTPUT SLOWLY TO 5μV
NOTE SEPARATION DECREASES AS GENERATOR LEVEL IS REDUCED BELOW 100μV
DISCONNECT RF GENERATOR
ADJUST R1011 FOR SIGNAL STRENGTH METER ZERO
END

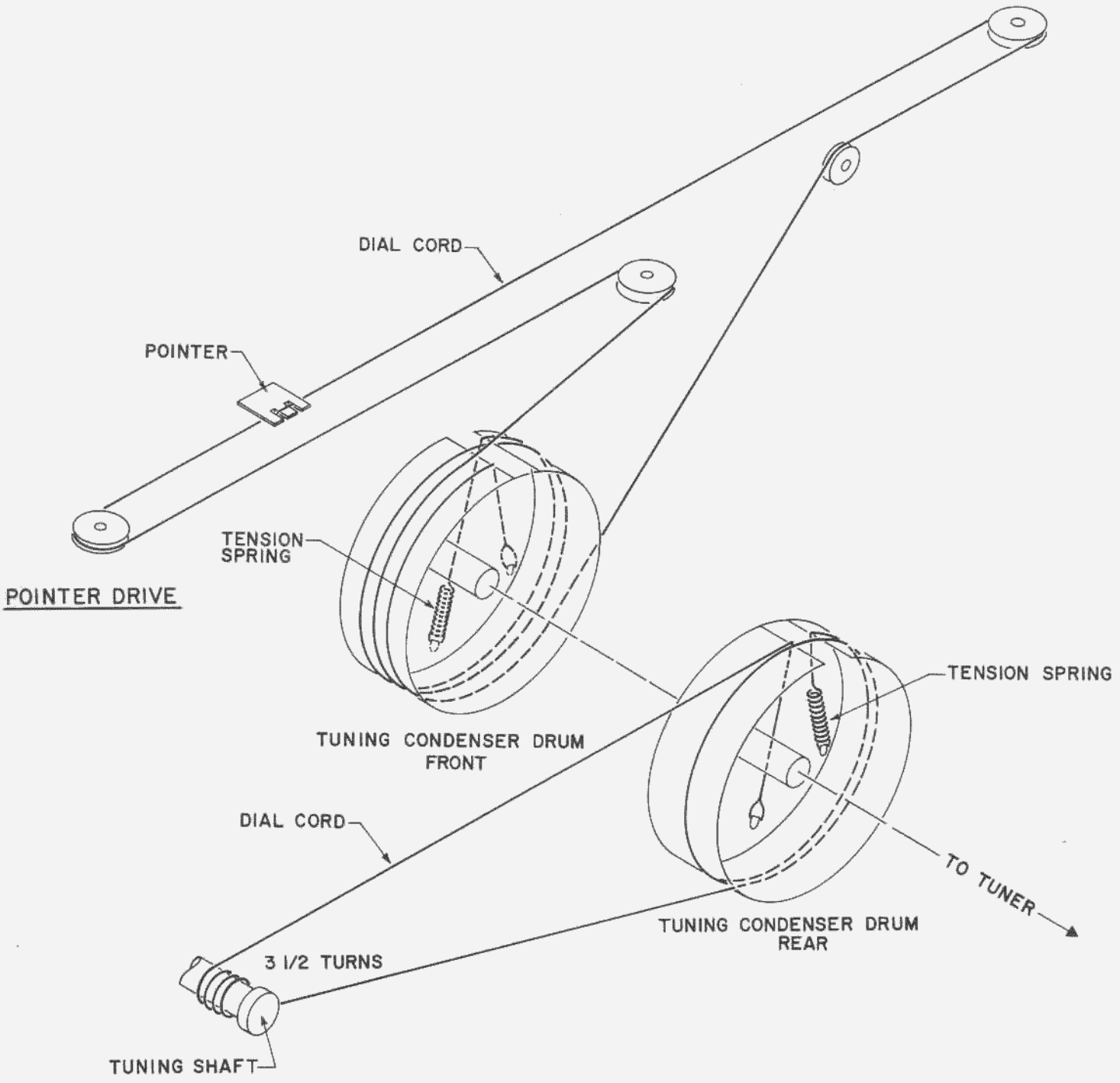
AM ALIGNMENT


START
TUNE RECEIVER TO POINT OF NO SIGNAL
SET THE SIGNAL GENERATOR TO 455 kHz. CLOCK-WISE
COUPLE THE GENERATOR THROUGH A .01μf CAPACITOR TO PIN 3 ON THE AM BOARD
ADJUST T1101 AND T1102 FOR MAXIMUM SIGNAL STRENGTH INDICATION
DECREASE GENERATOR SO SIGNAL STRENGTH METER IS BELOW 4
IS THIS THE SECOND PASS
NO
YES
COUPLE THE GENERATOR TO THE ANTENNA TERMINAL WITH A 200pf CAPACITOR
SET THE GENERATOR TO 600 kHz
TUNE THE RECEIVER TO 600 kHz ON THE DIAL
ADJUST L1102 (OSC COIL) FOR MAXIMUM SIGNAL STRENGTH METER INDICATION
DECREASE GENERATOR OUTPUT SO THE SIGNAL STRENGTH METER IS BELOW 4
SET THE GENERATOR TO 1400 kHz
TUNE THE RECEIVER TO 1400 kHz ON THE DIAL
ADJUST "AM3" ON THE FRONT END FOR MAXIMUM SIGNAL STRENGTH INDICATION
SET THE GENERATOR TO 600 kHz
TUNE RECEIVER TO THE GENERATOR
IS THE DIAL POINTER AT 600 kHz
NO
YES
ADJUST L1101 (AM ANTENNA ROD) AND L202 (AM-RF) FOR MAXIMUM SIGNAL STRENGTH INDICATOR
SET GENERATOR TO 1400 kHz
TUNE RECEIVER TO GENERATOR
ADJUST "AM1" AND "AM2" (ON FRONT END) FOR MAXIMUM SIGNAL STRENGTH INDICATION
SET GENERATOR TO 600 kHz
TUNE RECEIVER TO GENERATOR FREQUENCY
IS THIS THE THIRD PASS
NO
YES
SET GENERATOR TO 1000 kHz 30% MODULATION AT 400 Hz
CONNECT A DISTORTION ANALYZER TO THE L OR R TAPE OUTPUT
SET GENERATOR TO 10 mV OUTPUT
ADJUST R1101 "AM LEVEL" CONTROL FOR .3V OUTPUT AT THE TAPE OUTPUT JACKS
SET GENERATOR TO 1mV OUTPUT
MEASURE TOTAL HARMONIC DISTORTION SHOULD BE LESS THAN 1%
SET GENERATOR TO CLOCKWISE
MEASURE SIGNAL TO NOISE RATIO, SHOULD BE 45 dB BELOW 100% MODULATION
SENSITIVITY CANNOT BE MEASURED WITHOUT THE USE OF A SHIELDED ROOM
END

IHF SENSITIVITY MEASUREMENTS


START
CONNECT EQUIPMENT AS SHOWN IN DIAGRAM
SET GENERATOR TO MONO 90 mHz, 1 kμV OUTPUT
TUNE RECEIVER TO GENERATOR OUTPUT
SET DISTORTION ANALYZER FOR 100% OF FULL SCALE (SEE DISTORTION ANALYZER MANUAL)
SET DISTORTION ANALYZER TO DISTORTION (SEE MANUAL)
ADJUST ANALYZER FOR MINIMUM TOTAL HARMONIC DISTORTION READING
REDUCE GENERATOR RF OUTPUT UNTIL THE TOTAL HARMONIC DISTORTION IS 3% OR 30 dB BELOW THE REFERENCE LEVEL
THE IHF SENSITIVITY IS THE GENERATOR OUTPUT AT THIS TIME
END




DIAL CORD
POINTER
TENSION SPRING
POINTER DRIVE
TUNING CONDENSER DRUM FRONT
TENSION SPRING
DIAL CORD
TO TUNER
TUNING CONDENSER DRUM REAR
3 1/2 TURNS
TUNING SHAFT
TUNING CONDENSER DRIVE

All parts not listed are common items obtainable from radio parts jobbers.

Replacement parts may be obtained when ordered by PART NUMBER from:

McIntosh Laboratory, Inc.
Customer Service Department
2 Chambers Street
Binghamton, New York 13903
(Telephone 607-723-3512)

DIODES

Symbol Number	Description	Part Number
D101	LED lamp red	070-108
D102,103	LED lamp yellow	070-109
D104,105	LED lamp yellow	070-109
D106,107	LED lamp yellow	070-109
D108	LED lamp yellow	070-109
D201,202	LED lamp yellow	070-109
D203,204	LED lamp yellow	070-109
D205,206	LED lamp yellow	070-109
D207,208	LED lamp yellow	070-109
D209,210	LED lamp yellow	070-109
D211,212	LED lamp yellow	070-109
D213,214	LED lamp yellow	070-109
D215,216	LED lamp red	070-108
D217,218	Si. signal diode	070-047
D301,302	Si. Rectifier	070-031
D303,304	Si. Rectifier	070-031
SCR301	Rectifier	131-010
D601,602	Si. Rectifier	070-031
D603	Zener 18V	070-103
D604,605	Si. signal diode	070-047
D606,607	Si. signal diode	070-047
D608	Zener 15V	070-061
D609,610	Si. signal diode	070-047
D701,702	Si. signal diode	070-047
D703	Si. signal diode	070-047
D801,802	Si. signal diode	070-047
D803,804	Si. signal diode	070-047
D805,806	Si. signal diode	070-047
D807,808	Si. signal diode	070-047
D809,810	Si. signal diode	070-098
D811,812	Si. rectifier	070-031
D813,814	Si. rectifier	070-031
D1001,1002	Si. signal diode	070-003
D1003	Si. signal diode	070-003
D1004	Si. signal diode	070-046
D1005	Si. signal diode	070-047
D1007	Si. signal diode	070-047
D1008,1009	Si. signal diode	070-003
D1102	Si. signal diode	070-003
D1103	Si. signal diode	070-047

INTEGRATED CIRCUITS

IC201,202	Integrated Circuit	133-069
IC501,502	Integrated Circuit	133-066
IC701	Integrated Circuit	133-042
IC702,703	Integrated Circuit	133-037
IC704,705	Integrated Circuit	133-067
IC706,707	Integrated Circuit	133-051
IC708,709	Integrated Circuit	133-066
IC801,802	Integrated Circuit	133-068
IC901,902	Integrated Circuit	133-028
IC903,904	Integrated Circuit	133-028
IC905	Integrated Circuit	133-028
IC911,912	Integrated Circuit	133-066
IC1001,1002	Integrated circuit	133-031
IC1003	Integrated circuit	133-031
IC1004,1005	Integrated circuit	133-037
IC1006	Integrated circuit	133-056
IC1007	Integrated circuit	133-029
IC1008	Integrated circuit	133-005
IC1101	Integrated circuit	133-037

TRANSISTORS

Q601	Si NPN Power Transistor	132-173
Q602	Si NPN Transistor	132-171
Q603	Si PNP Power Transistor	132-174
Q604,605	Si NPN Transistor	132-143
Q606	Si NPN Transistor	132-171
Q607	Si PNP Transistor	132-150
Q801,802	Si NPN Transistor	132-185
Q803,804	Si NPN Transistor	132-185
Q805,806	Si PNP Transistor	132-096
Q807,808	Si PNP Transistor	132-096
Q809,810	Si PNP Transistor	132-187
Q811,812	Si PNP Transistor	132-150
Q813,814	Si NPN Transistor	132-143
Q815,816	Si NPN Transistor	132-143
Q817,818	Si PNP Transistor	132-150
Q819,820	Si NPN Transistor	132-092
Q821,822	PNP Medium Power	132-184
Q823,824	NPN Medium Power	132-183
Q825,826	PNP Darlington	132-182

Q1001,1002	Si NPN Transistor	132-093
Q1003	Si NPN Transistor	132-093
Q1101,1102	Transistor	132-110
Q1103	Transistor	132-110

CAPACITORS

C603	Elect. Cap 470µF 6V	066-197
C607	Elect. Cap 47µF 16V	066-215

RESISTORS

LDR801	LED Photoresistor	144-070
R1049,1050	Metal Film 5.11K 2% 1/4W	144-083
R1059,1060	Metal Film 10K 1% 1/4W	144-053

FILTERS

FN1001,1002	Ceramic Filter	180-024
FN1003,1004	Ceramic Filter	180-024

CHOKES

L1002	Coil Low Pass	122-015
L1003,1004	Choke 2.2µH	122-001
L1005,1006	Choke 75µH	122-013
L1101	AM RF Coil	122-086
L1102	AM Osc. Coil	162-073

SWITCHES

S1	INPUT SELECTOR	146-201
S3,4	Pushbutton Sw. Power Spkrs.	150-029
S401,405	Pushbutton Switch Tape	150-028

POTENTIOMETERS

R501	Volume Control	134-322
R502	Loudness-Balance	134-312
R901,902	Equalizer 30 & 150	134-316
R903,904	Equalizer 500 & 1500	134-316
R905	Equalizer 10K	134-316

FUSES

F1	Fuse 1A Norm Blo	089-002
F2	Fuse 4A Slo Blo	089-013
F3	Fuse 5A Slo Blo	089-030

RELAYS

K301	Relay DPST	087-019

TRANSFORMERS

T1	Power Transformer	159-141
T1101,1102	AM IF Transformer	162-050

FRONT PANEL & TRIM

Front Panel	018-196
Dial Glass	045-234
Handle	018-197
Tuning Knob	054-395
Input Selector Knob	090-199
Volume Knob	090-199
Loudness Knob	090-195
Balance Knob	090-196
Equalizer Knobs	090-202
Pushbuttons Black	017-246
Pushbuttons Red	017-247

METERS

Tuning	124-031
Signal Strength	124-032

LAMPS

Lamp #1847	058-008
Lamp Festoon	058-032

MISCELLANEOUS

Plastic Feet	017-156
Tuning Shaft	021-126
Shipping Carton	045-436
Push Terminal (Antenna)	074-051
Push Terminal (Speakers)	074-050
Owners Manual	039-042
Mounting Template	039-043
Dial Cord Pointer	045-236
Dial Cord Drive	045-235
Pointer	079-001
AC Line Cord	170-021
FM Dipole Antenna	170-033
Fuse Holder	178-106
Jumper	015-009
Hardware Package	045-239
Shorting Plug	127-021

PERFORMANCE LIMITS

POWER OUTPUT

100 watts minimum sine wave continuous average power output, per channel, both channels operating into 4 ohms 20 Hz to 20 kHz, with no more than .05% total harmonic distortion.

75 watts minimum sine wave continuous average power output, per channel, both channels operating into 8 ohms 20 Hz to 20 kHz, with no more than .05% total harmonic distortion.

OUTPUT LOAD IMPEDANCE

4 ohms, 8 ohms

RATED POWER BAND

20 Hz to 20 kHz

TOTAL HARMONIC DISTORTION

From phono input to speaker output, .05% maximum at any power level from 250 milliwatts to rated power per channel, 20 Hz to 20 kHz, both channels operating.

INTERMODULATION DISTORTION

.05% maximum if instantaneous peak power is twice rated continuous average power or less per channel with both channels operating for any combination of frequencies 20 Hz to 20 kHz.

FREQUENCY RESPONSE

20 Hz to 20 kHz + 0, - 0.5 dB at rated power

HUM AND NOISE

Power Amp: IHFA 100 dB, unweighted, 95 dB below rated output

TAPE AND AUX INPUT: IHFA 95 dB, unweighted,

Tape and Aux Input: IHFA 95 dB, unweighted, 90 dB below rated output

Phono input: IHFA 90, unweighted, 80 dB below 10 mV input

DAMPING FACTOR

Greater than 30

INPUT SENSITIVITY AND IMPEDANCE

Power Amp: 2.5V; 22,000 ohms
Tape and Aux: 250mV; 100,000 ohms
Phono: 2mV; 47,000 ohms; 87 pF

TAPE OUTPUT

Tuner: 1.0V at 100% modulation (FM)
Tape: 250 mV with rated input
Phono: 250mV with rated input

PROGRAM EQUALIZER

± 12 dB at 30, 150, 500, 1500, and 10,000 Hz

AM SECTION

SENSITIVITY

75 µV IHF (External antenna)

SIGNAL TO NOISE RATIO

45 dB minimum IHF, 55 dB at 100% modulation

HARMONIC DISTORTION

1% maximum at 30% modulation

FREQUENCY RESPONSE

3500 Hz @ -6 dB

ADJACENT CHANNEL SELECTIVITY

30 dB minimum IHF

IMAGE REJECTION

65 dB minimum, 540 kHz to 1600 kHz

FM SECTION

SENSITIVITY

2.5 µV (13 dBF) IHF minimum

SIGNAL TO NOISE RATIO

70 dB IHF minimum

HARMONIC DISTORTION

Mono: 0.18% IHF maximum
Stereo: 0.38% IHF maximum

FREQUENCY RESPONSE

20 Hz to 15 kHz + 0, -1 dB

CAPTURE RATIO

1.8 dB

SELECTIVITY

75 dB IHF minimum

SPURIOUS REJECTION

90 dB IHF minimum

IMAGE REJECTION

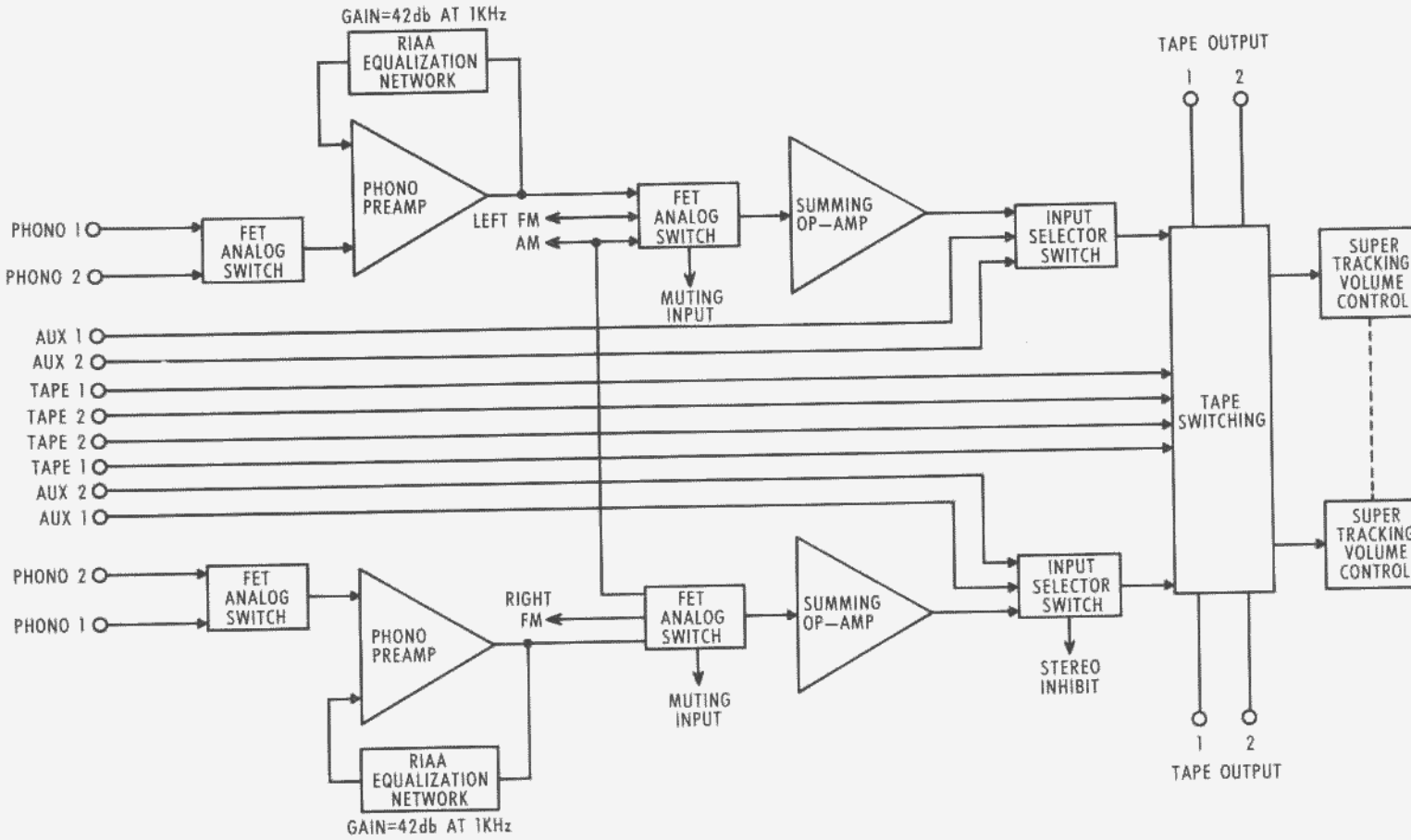
80 dB IHF minimum

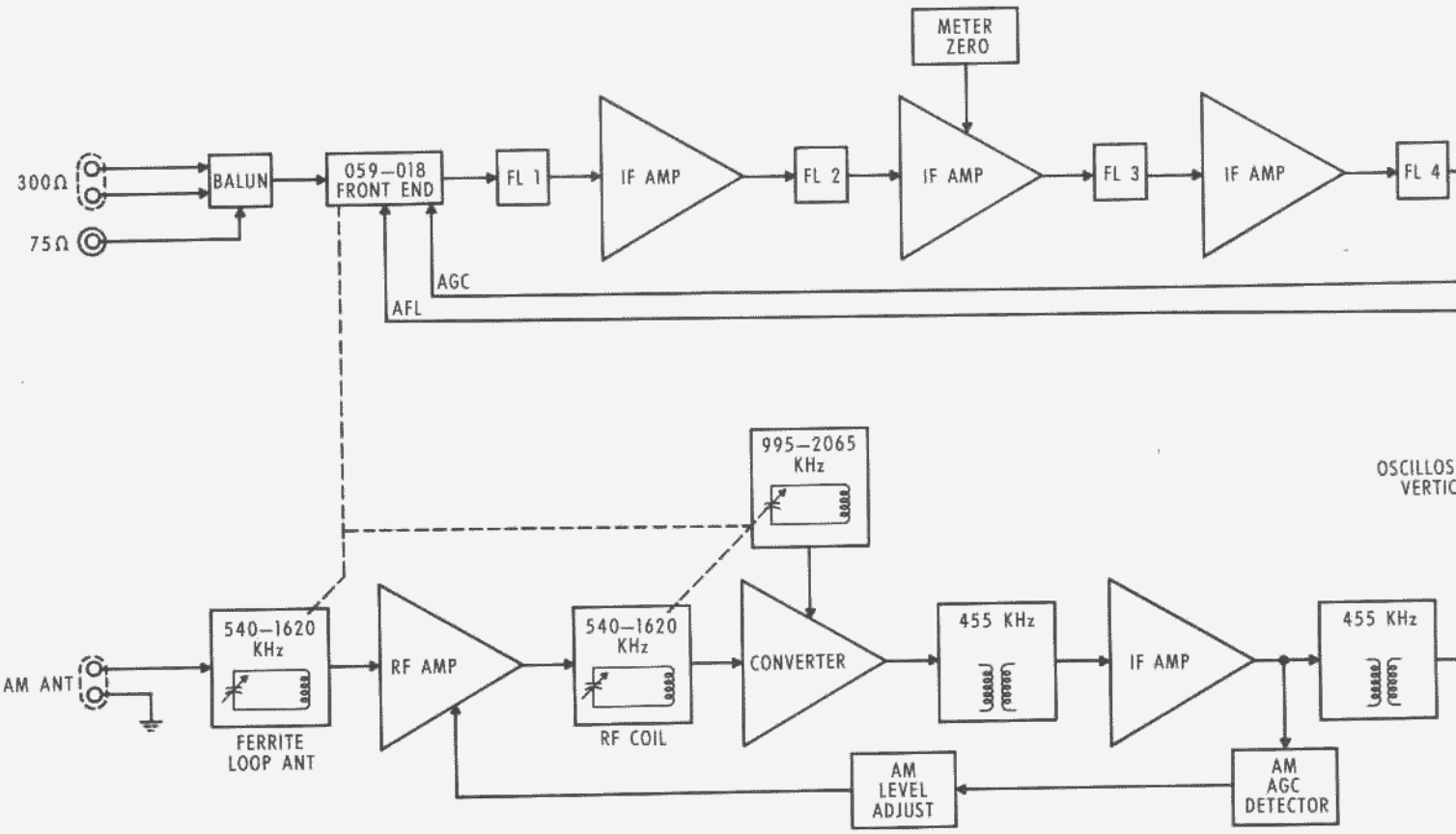
STEREO SEPARATION

45 dB minimum at 1 kHz

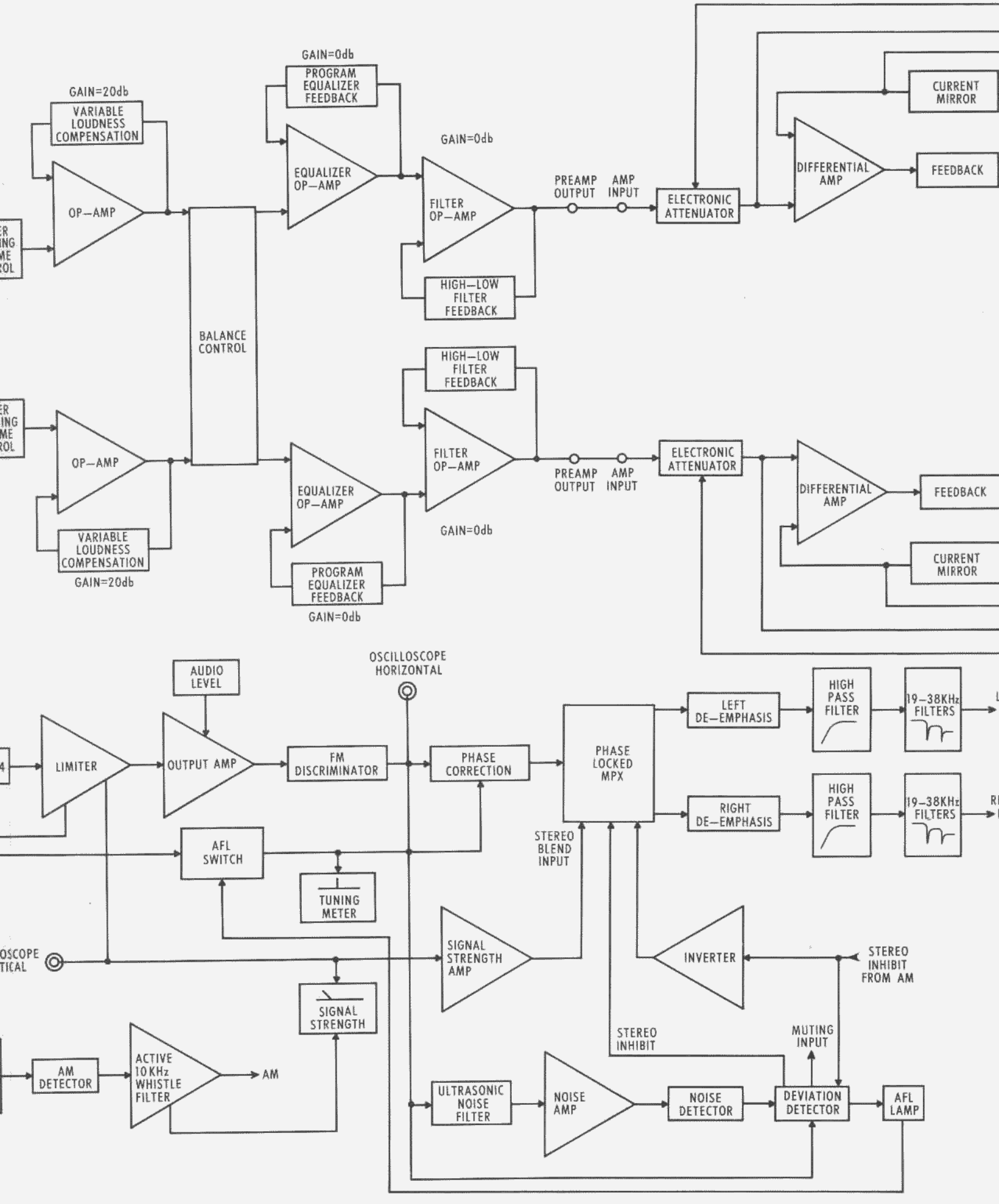
SCA REJECTION

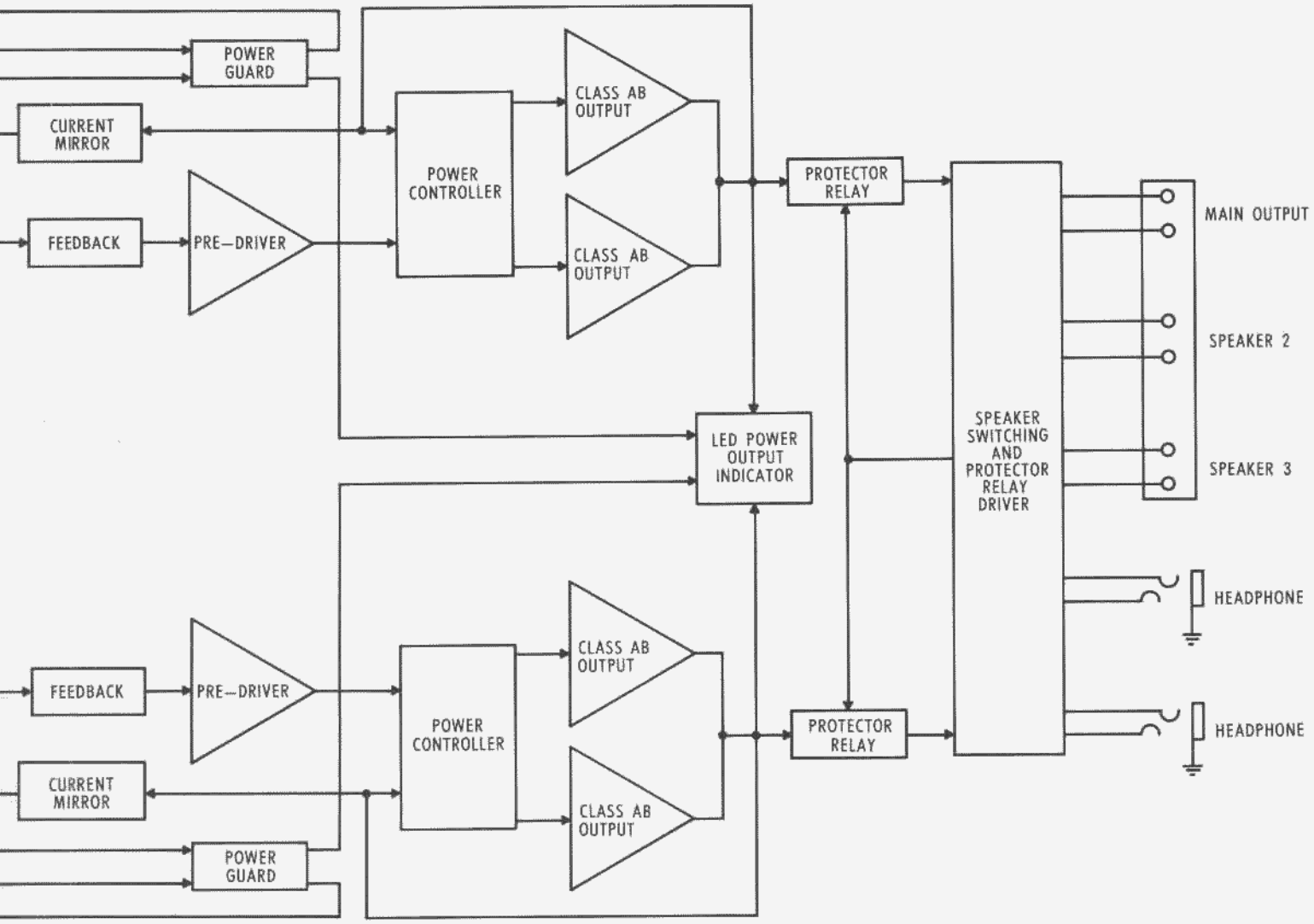
60 dB minimum

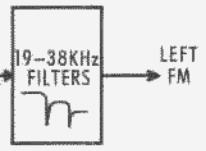


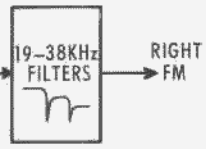


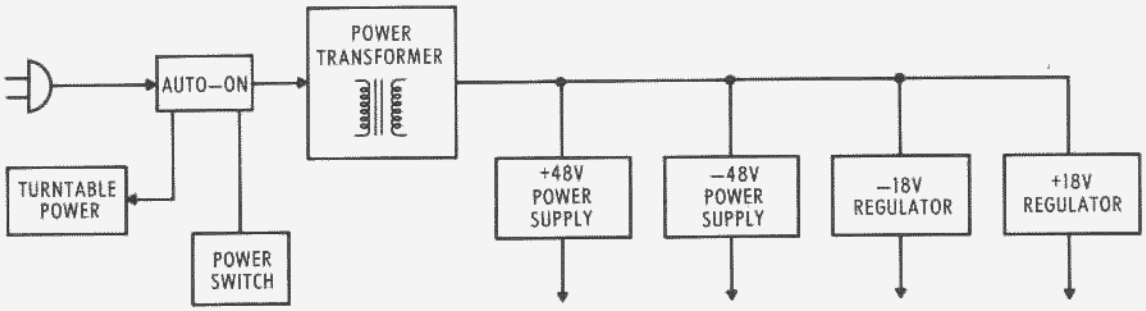
BLOCK DIAGRAM

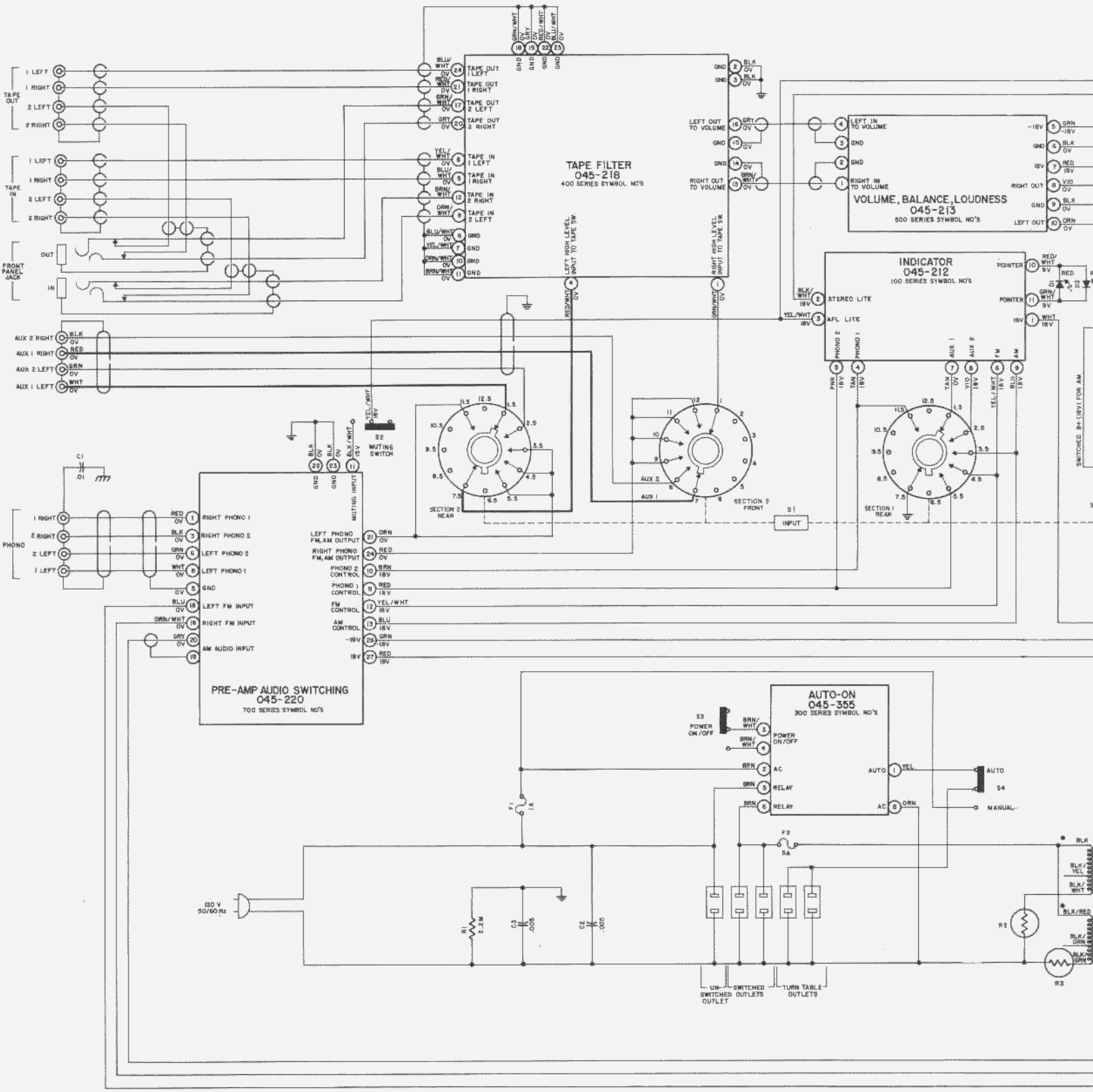

GAIN=20db
VARIABLE LOUDNESS COMPENSATION
OP—AMP
GAIN=0db
PROGRAM EQUALIZER FEEDBACK
EQUALIZER OP—AMP
GAIN=0db
FILTER OP—AMP
HIGH—LOW FILTER FEEDBACK
PREAMP OUTPUT
AMP INPUT
ELECTRONIC ATTENUATOR
DIFFERENTIAL AMP
CURRENT MIRROR
FEEDBACK
BALANCE CONTROL
OP—AMP
VARIABLE LOUDNESS COMPENSATION
GAIN=20db
EQUALIZER OP—AMP
PROGRAM EQUALIZER FEEDBACK
GAIN=0db
HIGH—LOW FILTER FEEDBACK
FILTER OP—AMP
GAIN=0db
PREAMP OUTPUT
AMP INPUT
ELECTRONIC ATTENUATOR
DIFFERENTIAL AMP
FEEDBACK
CURRENT MIRROR
AUDIO LEVEL
OSCILLOSCOPE HORIZONTAL
LIMITER
OUTPUT AMP
FM DISCRIMINATOR
PHASE CORRECTION
PHASE LOCKED MPX
LEFT DE—EMPHASIS
HIGH PASS FILTER
19—38KHz FILTERS
RIGHT DE—EMPHASIS
HIGH PASS FILTER
19—38KHz FILTERS
AFL SWITCH
TUNING METER
STEREO BLEND INPUT
SIGNAL STRENGTH AMP
INVERTER
STEREO INHIBIT FROM AM
SIGNAL STRENGTH
STEREO INHIBIT
MUTING INPUT
AM DETECTOR
ACTIVE 10KHz WHISTLE FILTER
AM
ULTRASONIC NOISE FILTER
NOISE AMP
NOISE DETECTOR
DEVIATION DETECTOR
AFL LAMP

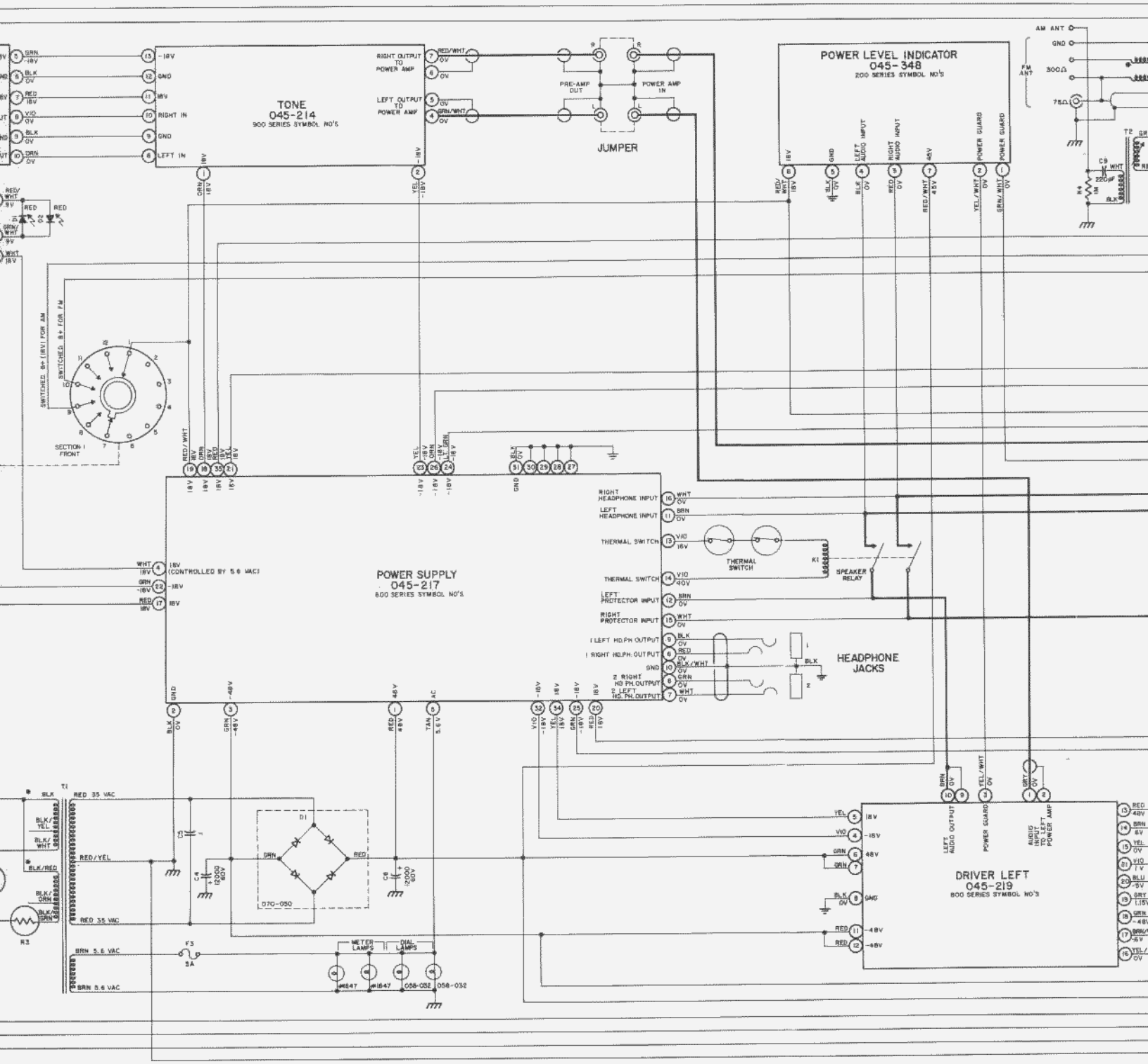

POWER GUARD
CURRENT MIRROR
FEEDBACK
PRE—DRIVER
POWER CONTROLLER
CLASS AB OUTPUT
CLASS AB OUTPUT
PROTECTOR RELAY
LED POWER OUTPUT INDICATOR
SPEAKER SWITCHING AND PROTECTOR RELAY DRIVER
MAIN OUTPUT
SPEAKER 2
SPEAKER 3
HEADPHONE
HEADPHONE
FEEDBACK
PRE—DRIVER
POWER CONTROLLER
CLASS AB OUTPUT
CLASS AB OUTPUT
PROTECTOR RELAY
CURRENT MIRROR
POWER GUARD

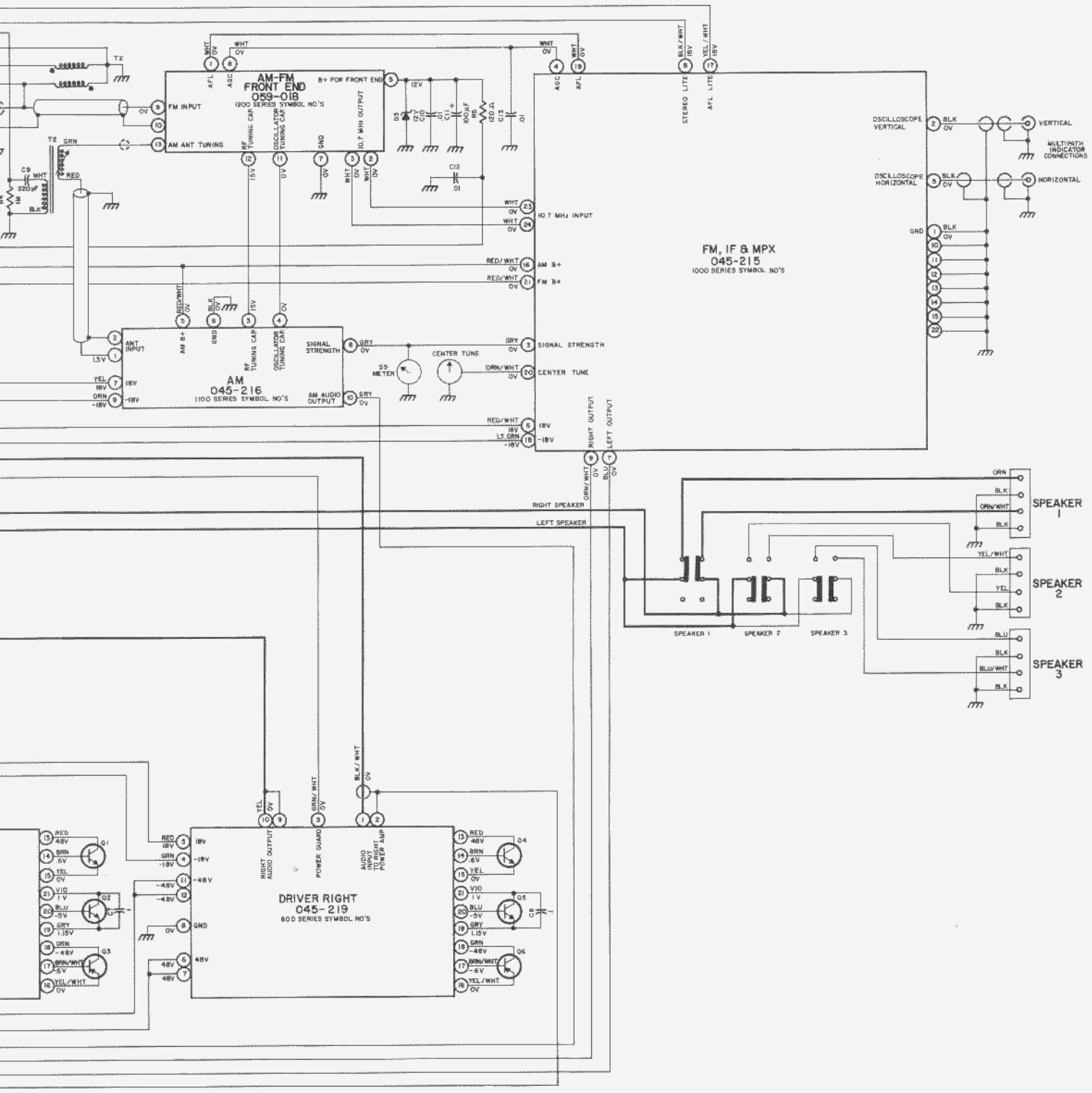

19—38KHz FILTERS
LEFT FM


19—38KHz FILTERS
RIGHT FM


AUTO—ON
POWER TRANSFORMER
TURNTABLE POWER
POWER SWITCH
+48V POWER SUPPLY
—48V POWER SUPPLY
—18V REGULATOR
+18V REGULATOR


TAPE FILTER
045-218
400 SERIES SYMBOL NO'S
VOLUME, BALANCE, LOUDNESS
045-213
500 SERIES SYMBOL NO'S
INDICATOR
045-212
100 SERIES SYMBOL NO'S
PRE-AMP AUDIO SWITCHING
045-220
700 SERIES SYMBOL NO'S
AUTO-ON
045-355
300 SERIES SYMBOL NO'S
TAPE OUT
TAPE IN
FRONT PANEL JACK
PHONO
AUX 2 RIGHT
AUX 1 RIGHT
AUX 2 LEFT
AUX 1 LEFT
S2 MUTING SWITCH
S1 INPUT
S3 POWER ON/OFF
S4 AUTO MANUAL
F1 1A
F2 5A
120 V 50/60 Hz
UN-SWITCHED OUTLET
SWITCHED OUTLETS
TURN TABLE OUTLETS


TONE
045-214
900 SERIES SYMBOL NO'S
JUMPER
POWER LEVEL INDICATOR
045-348
200 SERIES SYMBOL NO'S
POWER SUPPLY
045-217
800 SERIES SYMBOL NO'S
HEADPHONE JACKS
DRIVER LEFT
045-219
800 SERIES SYMBOL NO'S
SECTION I
FRONT
SWITCHES B+ (18V) FOR AM
SWITCHES B+ FOR FM
THERMAL SWITCH
SPEAKER RELAY
D70-050
METER LAMPS
DIAL LAMPS
#1847
#1847
058-032
058-032
AM ANT
FM ANT
GND
300Ω
75Ω


AM-FM
FRONT END
059-018
1200 SERIES SYMBOL NO'S
FM INPUT
AM ANT TUNING
B+ FOR FRONT END
10.7 MHz OUTPUT
AFL
AGC
RF TUNING CAP.
OSCILLATOR TUNING CAP.
GND
12V
15V
0V
FM, IF & MPX
045-215
1000 SERIES SYMBOL NO'S
10.7 MHz INPUT
AM B+
FM B+
STEREO LITE
AFL LITE
OSCILLOSCOPE VERTICAL
OSCILLOSCOPE HORIZONTAL
VERTICAL
HORIZONTAL
MULTIPATH INDICATOR CONNECTIONS
GND
AM
045-216
1100 SERIES SYMBOL NO'S
ANT INPUT
AM B+
GND
RF TUNING CAP.
OSCILLATOR TUNING CAP.
SIGNAL STRENGTH
AM AUDIO OUTPUT
S9 METER
CENTER TUNE
SIGNAL STRENGTH
CENTER TUNE
RIGHT OUTPUT
LEFT OUTPUT
RIGHT SPEAKER
LEFT SPEAKER
SPEAKER 1
SPEAKER 2
SPEAKER 3
DRIVER RIGHT
045-219
600 SERIES SYMBOL NO'S
RIGHT AUDIO OUTPUT
POWER GUARD
AUDIO INPUT TO RIGHT POWER AMP
Q1
Q2
Q3
Q4
Q5
Q6

SCHEMATIC NOTES

1. Printed circuit board assemblies are outlined on the schematics by dotted lines. The circled numbers on the dotted lines correspond to the numbers on the printed circuit board layouts.

2. The heavy lines on the schematics denote the primary signal path.

3. The terminal numbering of rotary switches is for reference only.

4. A dot on the rotor of a rotary switch indicates that there is an electrical connection between the front and rear rotor section.

5. Unless otherwise specified: Resistance values in the AM, FM & MPX, and Preamp sections are in ohms, 1/4 watt, and 5% tolerance; resistance values in the Power Output and Power Supply sections are in ohms, 1/4 watt, 5% tolerance; capacitance values smaller than 1 are in microfarads (µF); capacitance values greater than 1 are in picofarads (pF); inductors are in microhenries (µH).

6. To align power supply connect voltmeter to terminal 17 on the power supply PC board and adjust " +18V voltage control" (R622) for between + 17.1 to 18.0 volts.

7. All voltages indicated on the schematics are measured under the following conditions:

   Use of an 11 megohm input impedance VTVM. — All voltages ± 10% with respect to ground.

   No signal at antenna or other input terminals. — AC input at 120 volts, 50/60 Hz.

   Front panel controls at:

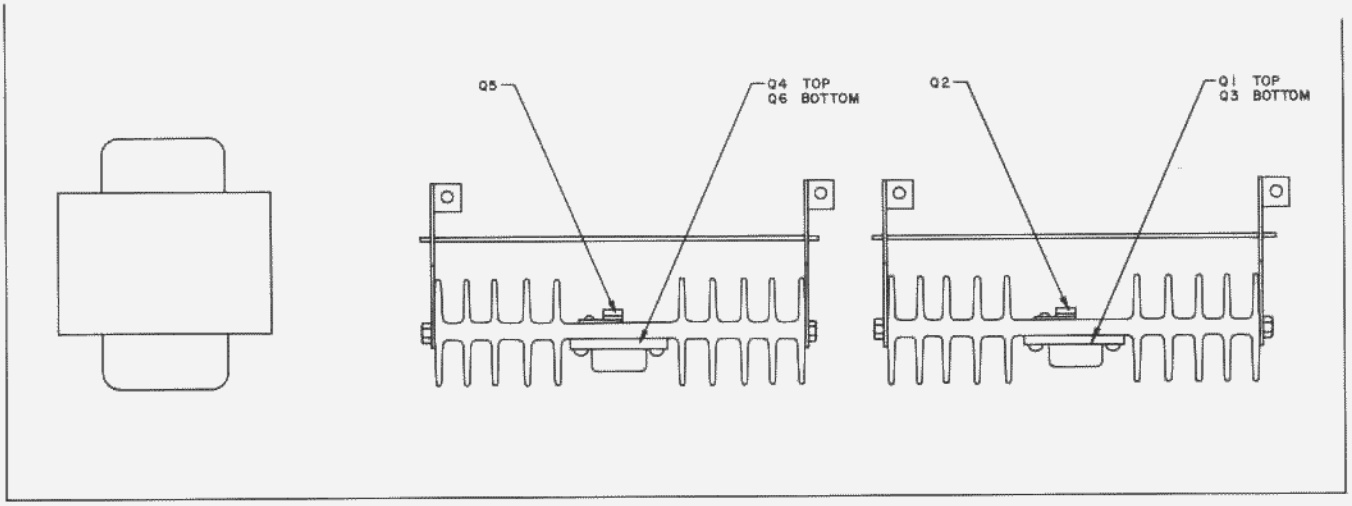
Mono/Stereo switch	Out	Muting	Out
Speaker switches	Out	Loudness	ccw
Volume control	Min	Tape Monitors	Out
Balance control	Middle	Tape 1 2	Out
Tone controls	Flat	Tape 2 1	Out
Input selector	Aux 1 FM (to measure FM section) AM (to measure AM section)	Tuning indicator	Out (no signal)

8. To adjust output stage bias operate the MAC 4100 at 120 volts line input with no input signal. Measure the AC line input power (approximately 40 watts) or current (approximately .3A). The bias potentiometer R851 and R852 are located on the power output PC boards.

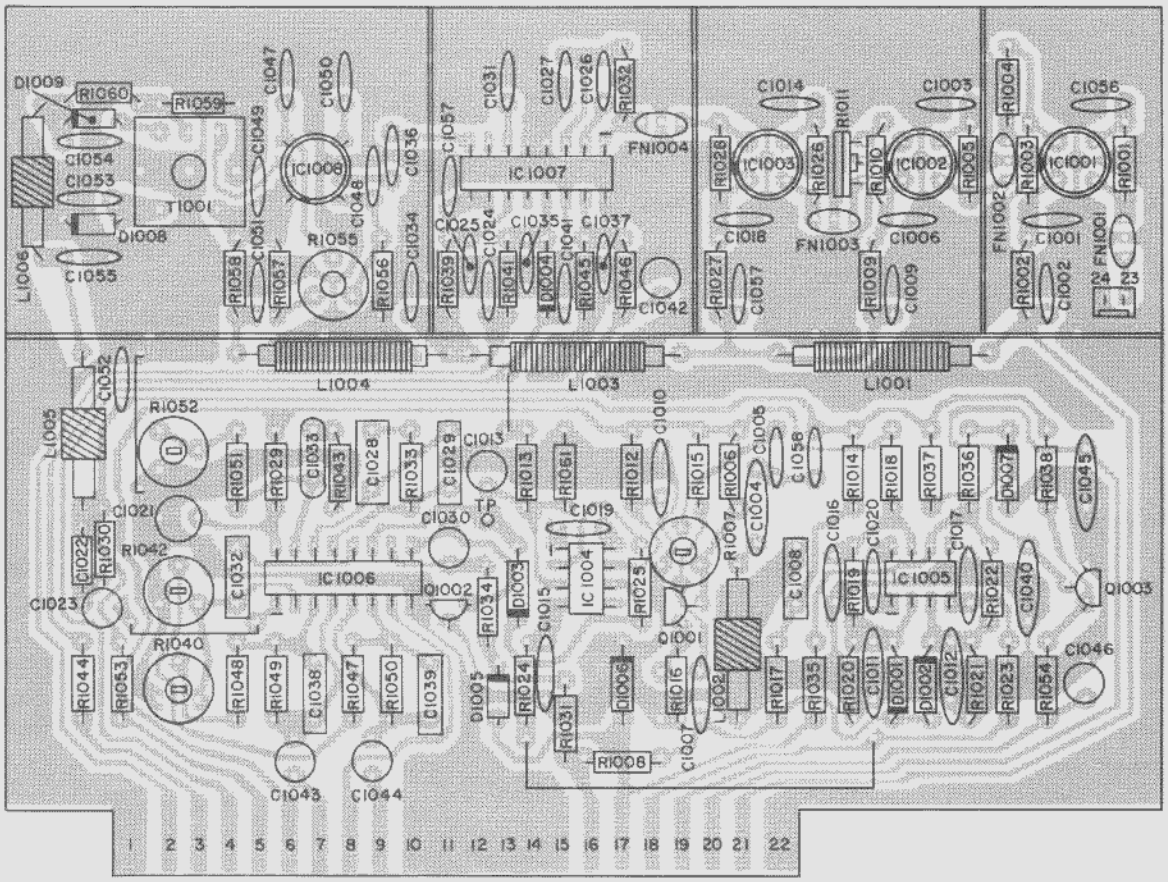
   a. Turn both bias potentiometers full counterclockwise.

   b. Rotate bias adjustment clockwise to the point where the line input power or current begins to increase then back off slightly to the point where the line input just reaches its lowest value.

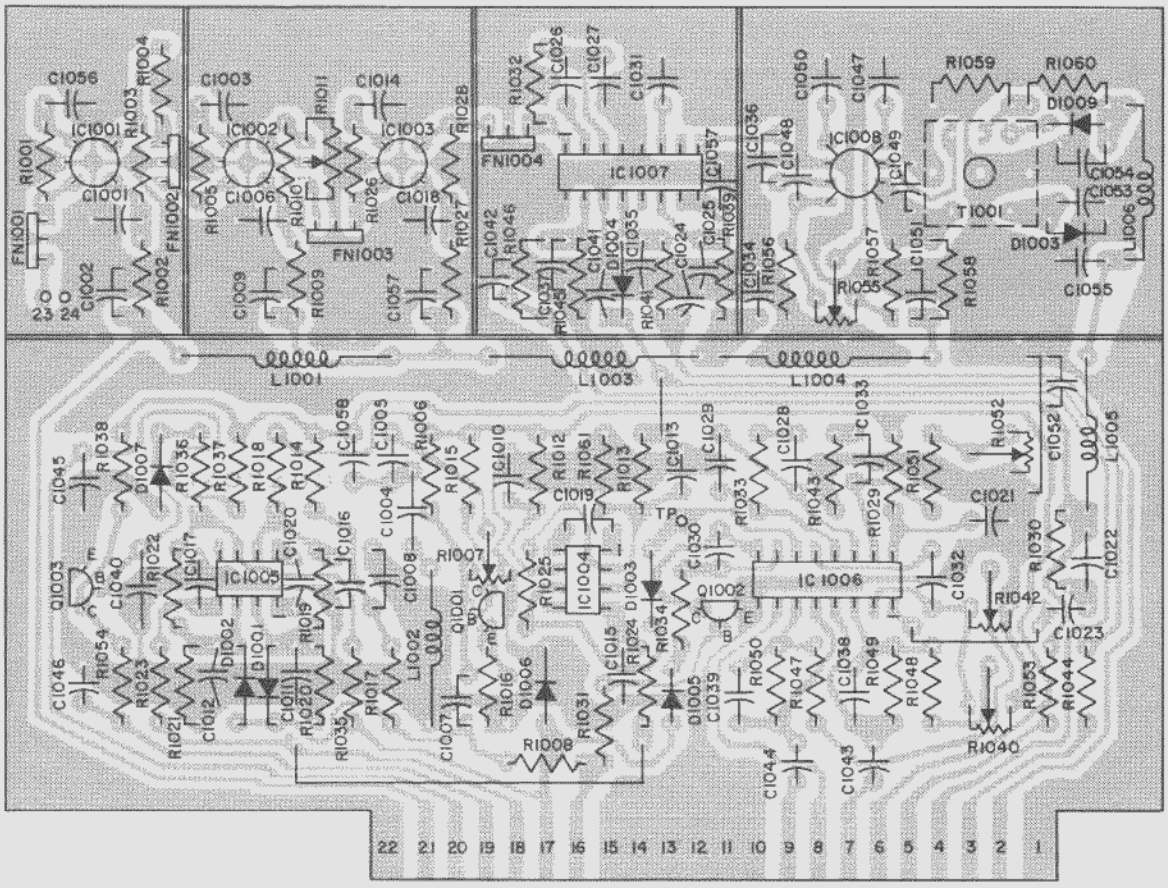
   c. Repeat step b for each channel independently.



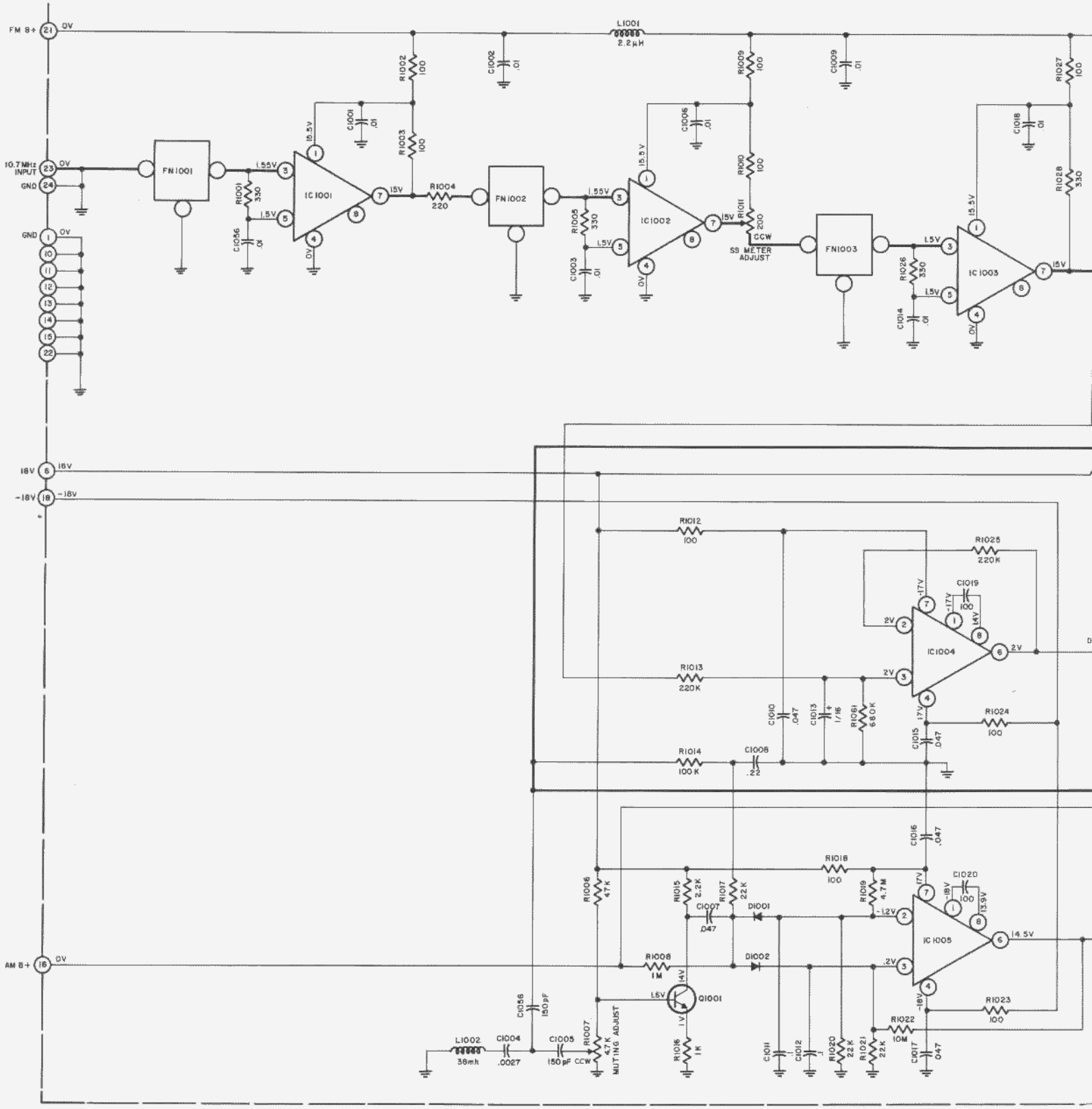
TOP– REAR
LOCATION OF TRANSISTORS NOT ON PC BOARDS

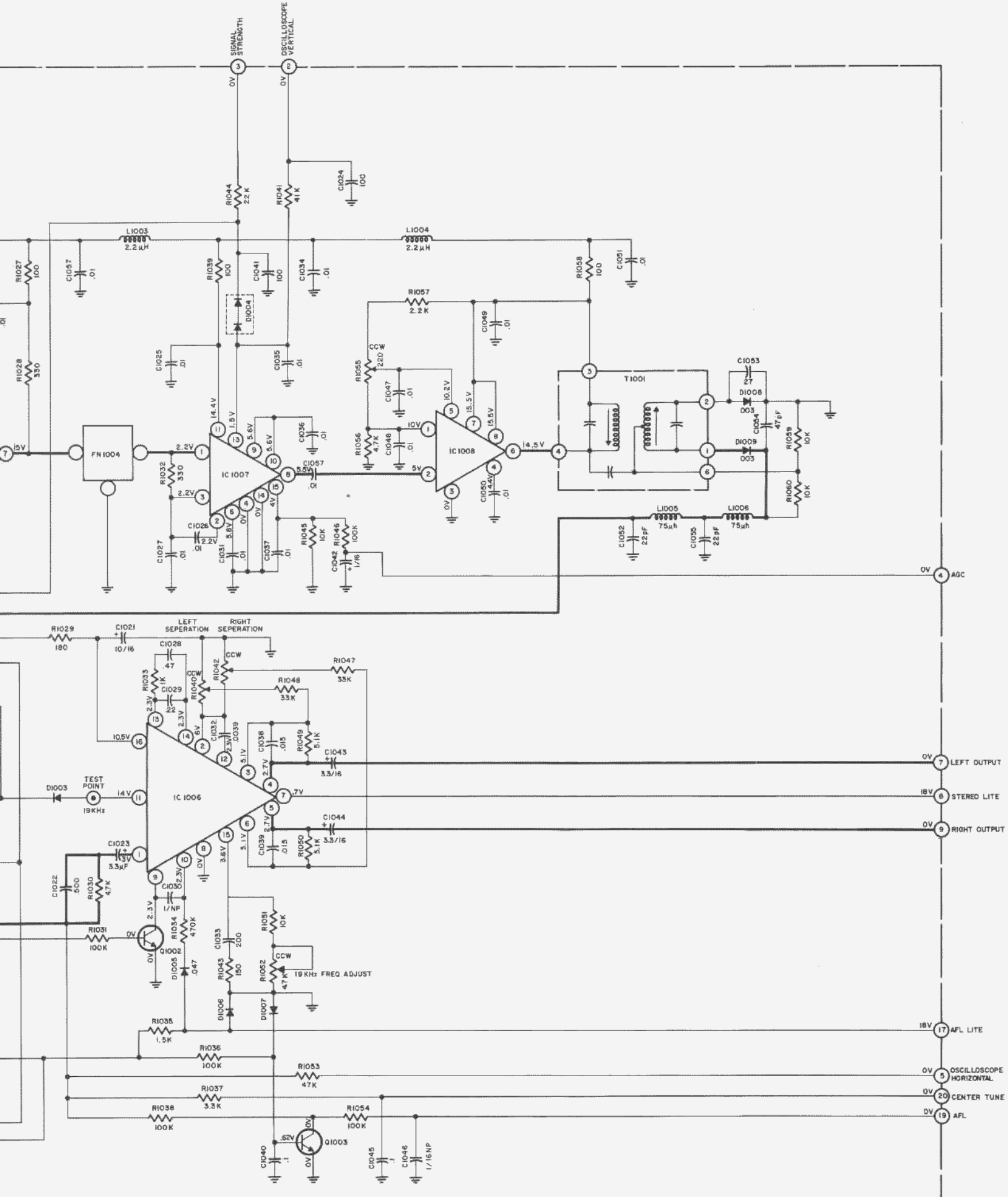


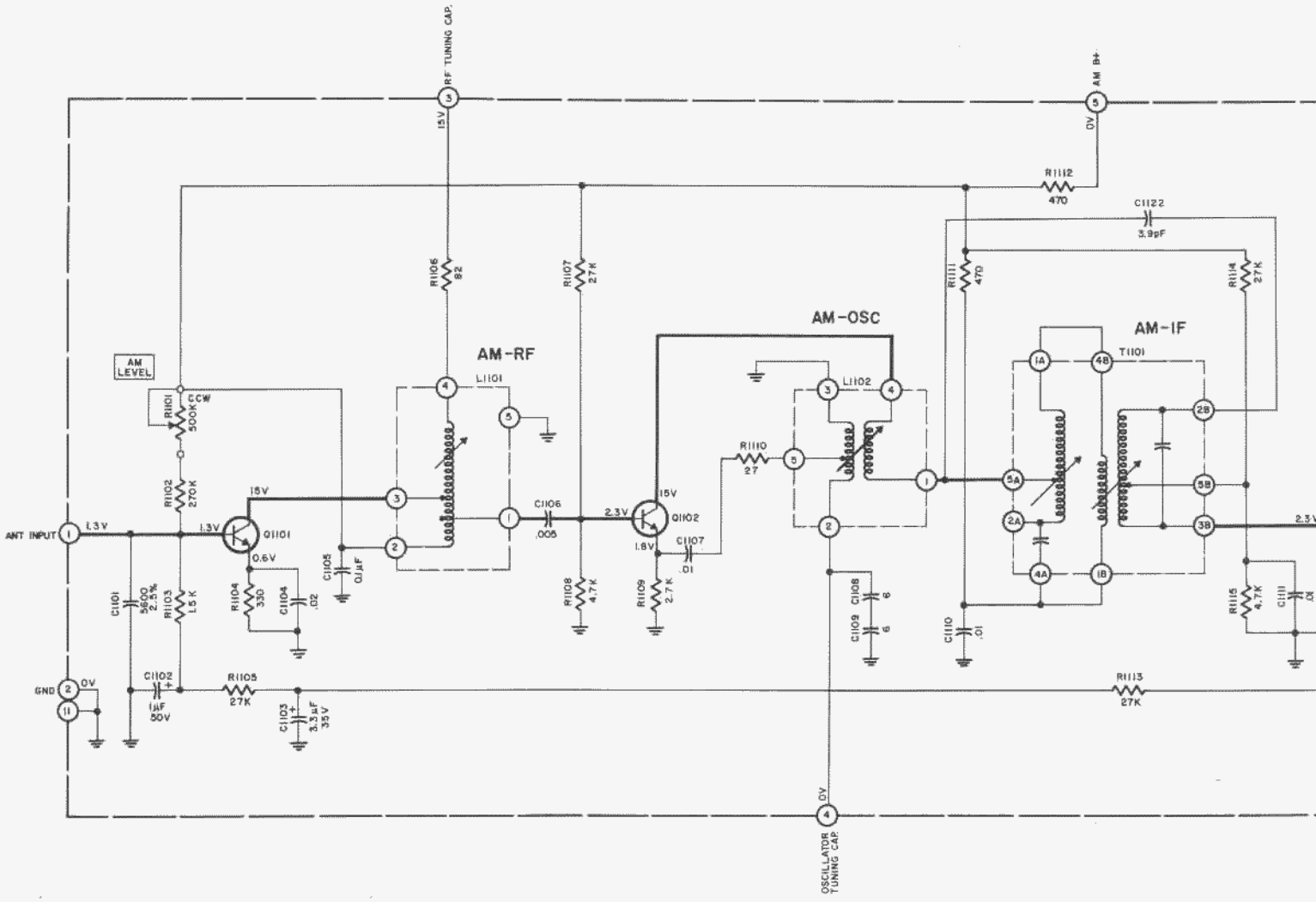
FM, IF, MPX PC BOARD
045215



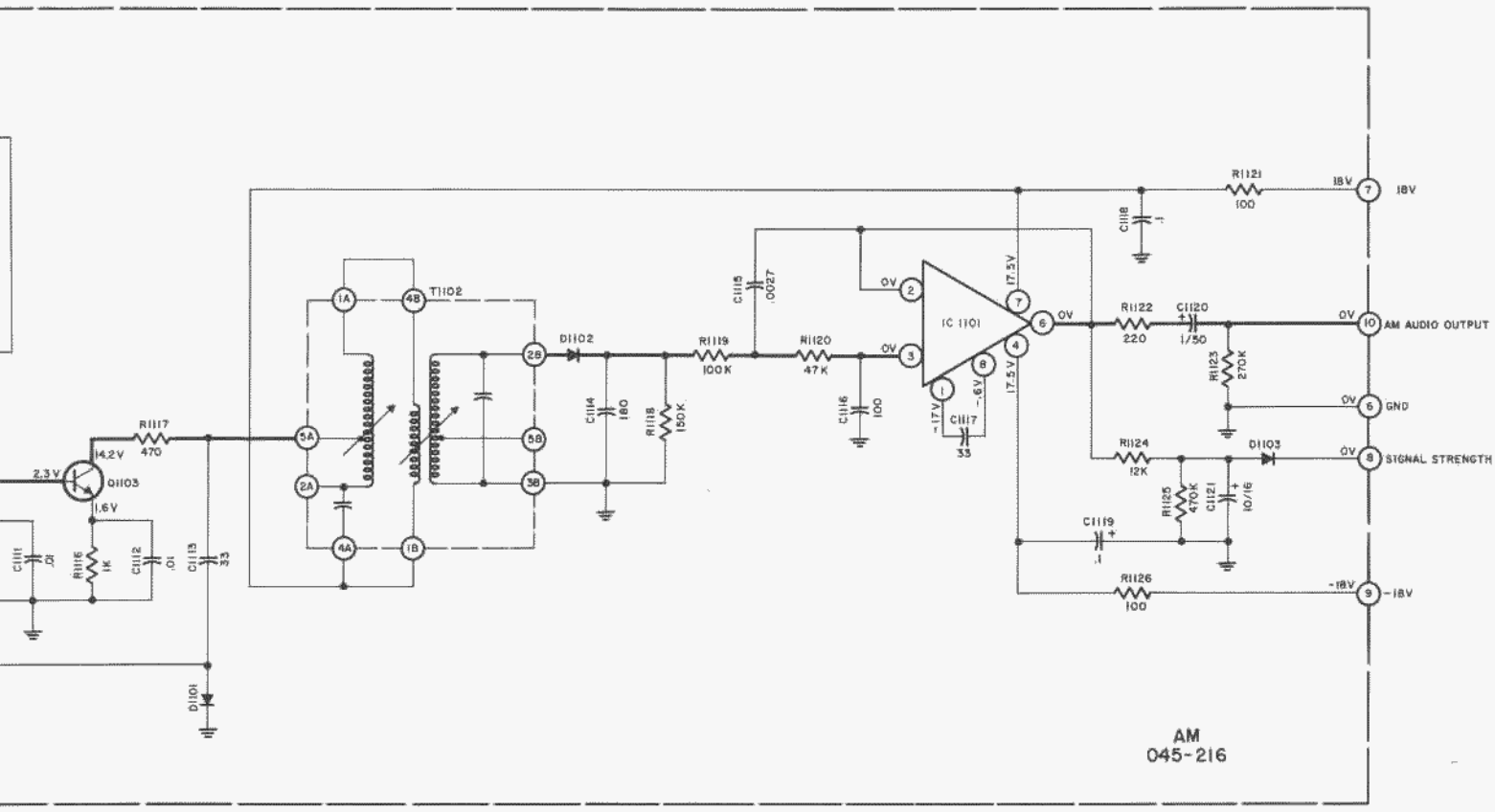
FM, IF, MPX
045-215

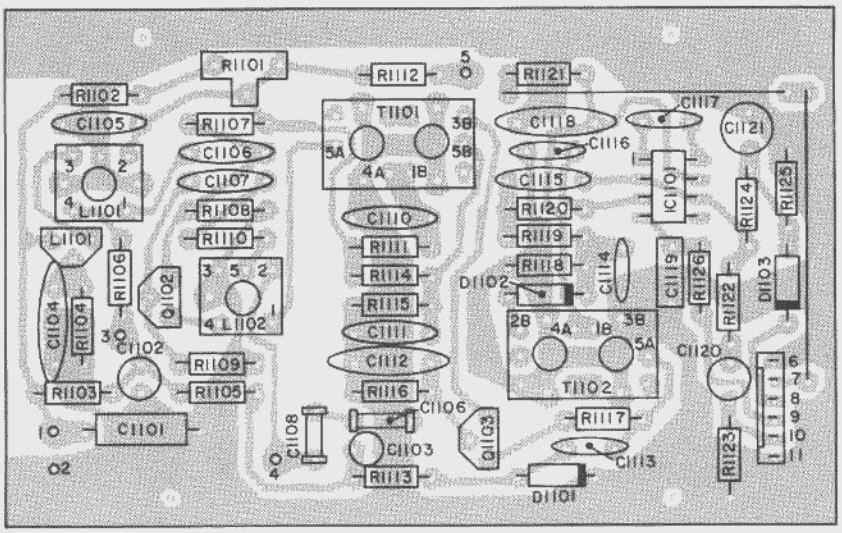



SIGNAL STRENGTH
OSCILLOSCOPE VERTICAL
L1003 2.2 µH
L1004 2.2 µH
R1044 22 K
R1041 41 K
C1024 100
R1027 100
C1037 .01
R1039 100
C1041 100
C1034 .01
R1058 100
C1051 .01
D1004
R1057 2.2 K
C1049 .01
R1028 330
C1025 .01
C1035 .01
R1055 220 CCW
C1047 .01
T1001
C1053 27
D1008 .003
C1054 47 pF
R1059 10K
D1009 .003
R1060 10K
FM 1004
IC 1007
R1032 330
C1036 .01
C1057 .02
R1056 4.7K
C1048 .01
IC 1008
C1050 .01
C1026 .01
C1027 .01
C1031 .01
C1037 .01
R1045 10K
R1046 100K
C1042 1/16
L1005 75µh
L1006 75µh
C1052 22 pF
C1055 22 pF
AGC
R1029 180
C1021 10/16
LEFT SEPERATION
RIGHT SEPERATION
C1028 47
R1033 1K
C1029 .22
R1042 CCW
R1040 CCW
R1047 33K
R1048 33K
C1032 .0039
C1038 .015
R1049 5.1K
C1043 3.3/16
LEFT OUTPUT
D1003
TEST POINT
19KHz
IC 1006
STEREO LITE
C1044 3.3/16
RIGHT OUTPUT
C1023 3V 3.3µF
C1022 .500
R1030 4.7K
C1030 1/NP
C1039 .015
R1050 5.1K
R1031 100K
Q1002
R1034 470K
C1033 200
R1051 10K
D1005 .047
R1043 150
R1052 47K CCW
19 KHz FREQ ADJUST
D1006
D1007
AFL LITE
R1035 1.5K
R1036 100K
R1053 47K
OSCILLOSCOPE HORIZONTAL
R1037 3.3K
CENTER TUNE
R1038 100K
R1054 100K
AFL
Q1003
C1040 .1
C1045 .1
C1046 1/16NP

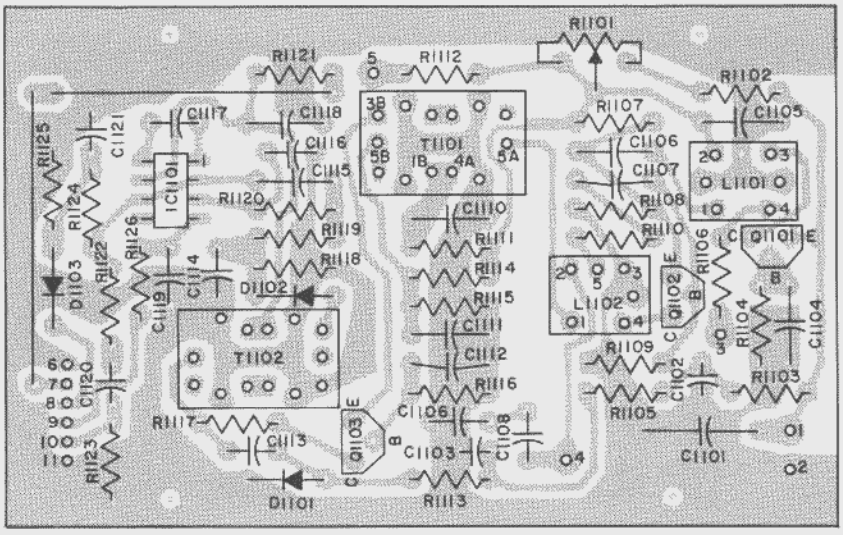

RF TUNING CAP.
AM B+
15V
0V
R1112
470
C1122
3.9pF
R1106
82
R1107
27K
R1111
470
R1114
27K
AM-OSC
AM-IF
AM-RF
AM LEVEL
R1101
CCW
500K
L1101
L1102
T1101
R1102
270K
15V
ANT INPUT
1.3V
1.3V
Q1101
0.6V
C1106
.005
2.3V
Q1102
1.8V
C1107
.01
R1110
27
C1105
0.1μF
C1101
R1103
1.5K
R1104
330
C1104
.02
R1108
4.7K
R1109
2.7K
C1108
6
C1109
6
C1110
.01
R1115
4.7K
GND
0V
C1102
1μF
50V
R1105
27K
C1103
3.3μF
35V
R1113
27K
0V
OSCILLATOR TUNING CAP.

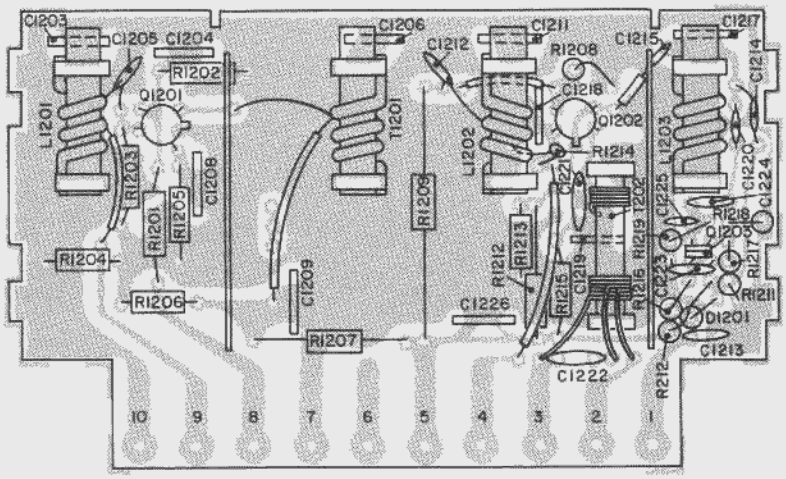
AM SECTION


R1121
100
18V
7
18V
C1118
.1
R1122
220
C1120
1/50
0V
10
AM AUDIO OUTPUT
R1123
270K
0V
5
GND
R1124
12K
D1103
0V
8
SIGNAL STRENGTH
R1125
470K
C1121
10/16
C1119
.1
R1126
100
-18V
9
-18V
IC 1101
17.5V
0V
-17V
-6V
C1117
33
C1115
.0027
R1119
100K
R1120
47K
C1116
100
D1102
C1114
180
R1118
150K
T1102
1A
4B
2B
5B
3B
2A
4A
1B
5A
R1117
470
14.2V
2.3V
Q1103
1.6V
C1111
.01
R1116
1K
C1112
.01
C1113
33
D1101
AM
045-216

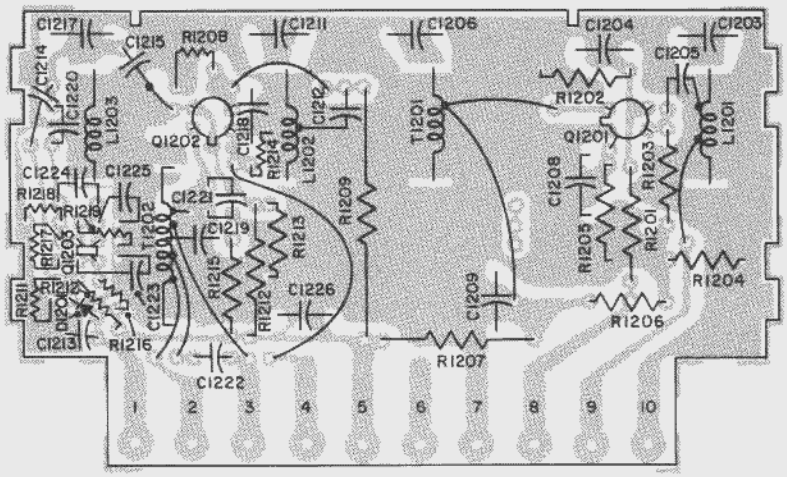


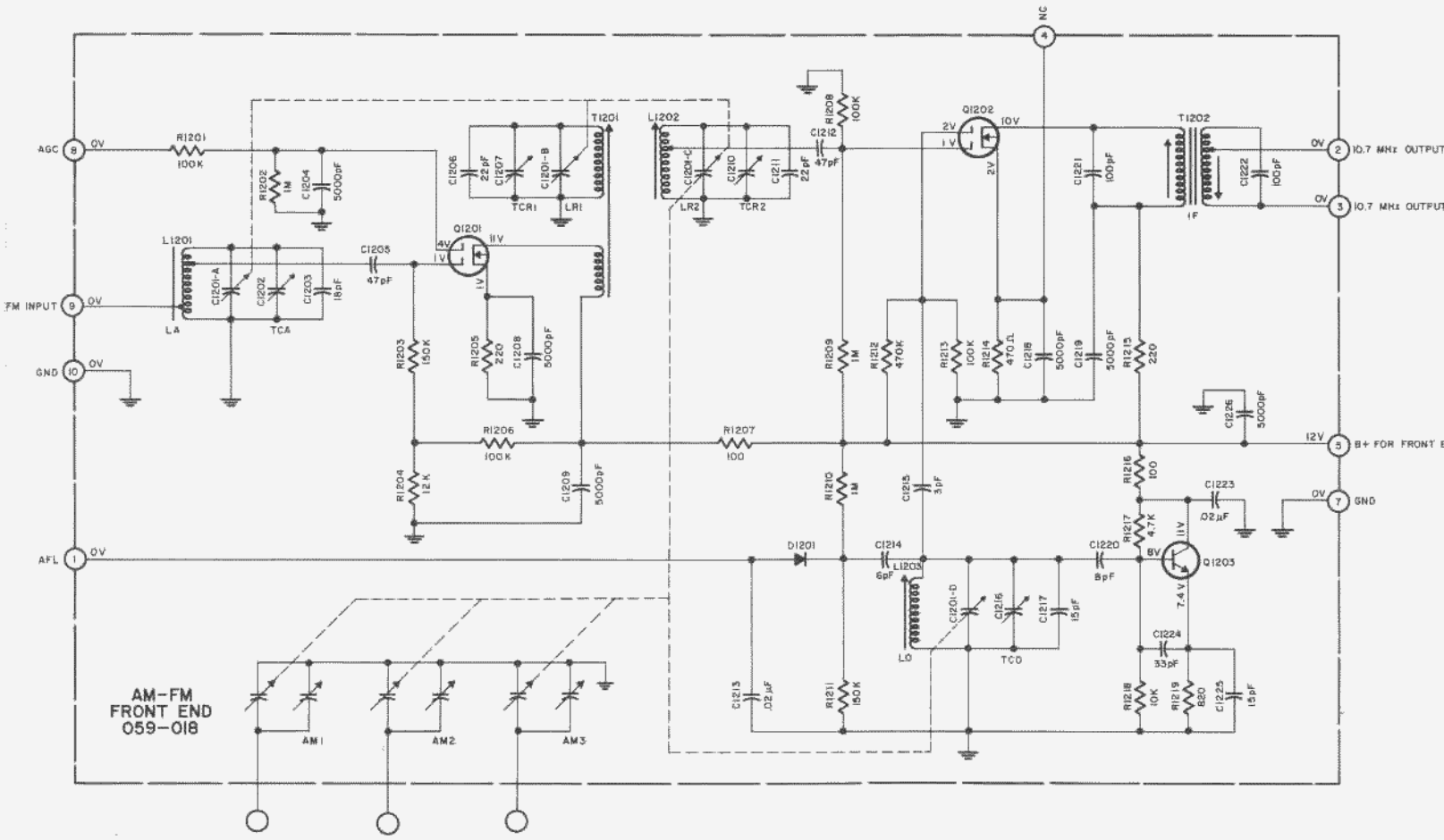
AM PC BOARD
045216

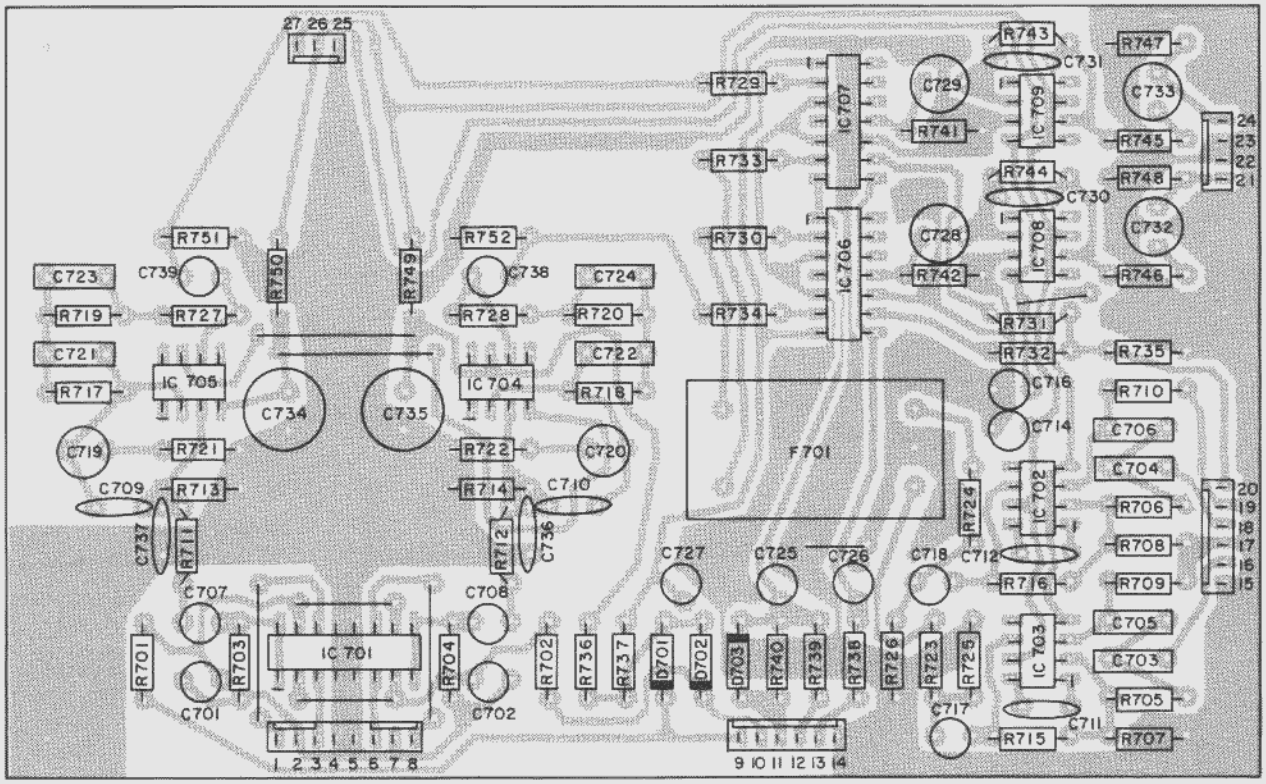




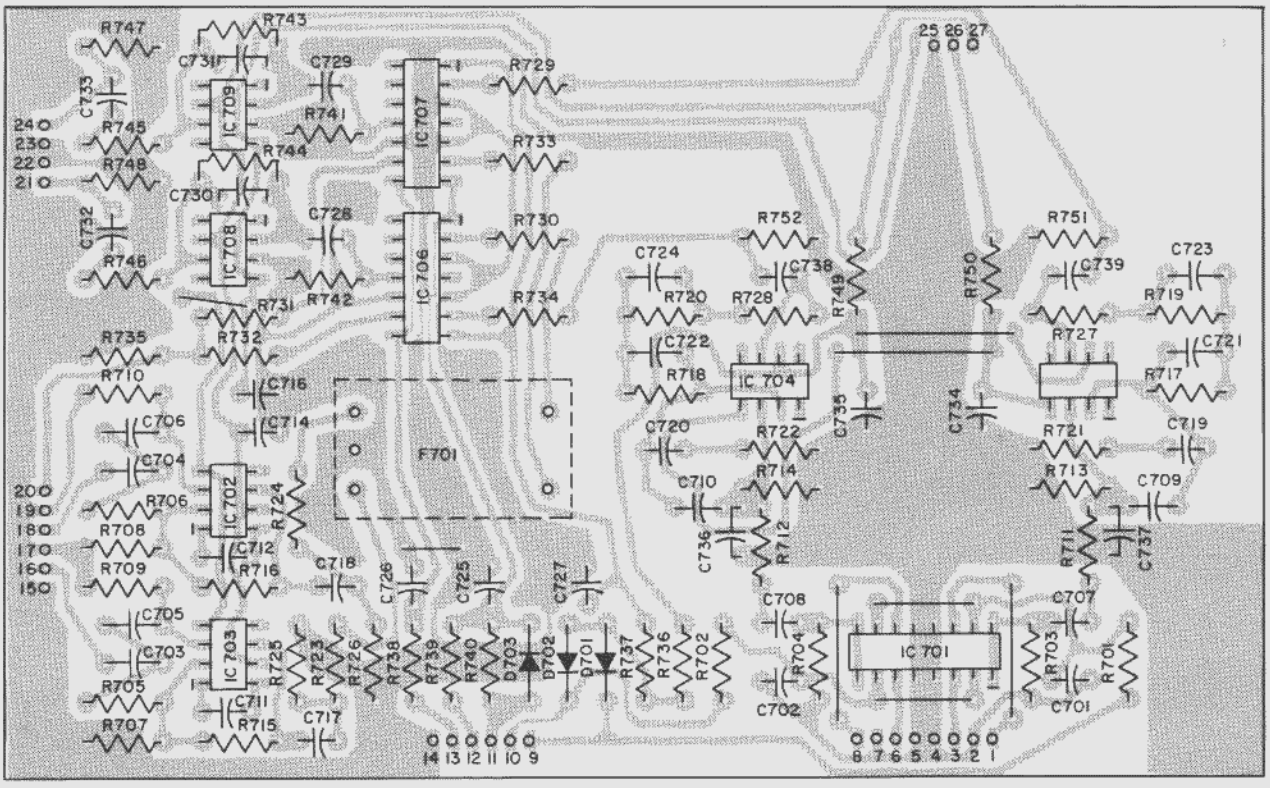
AM-FM
FRONT END PC BOARD
059-018

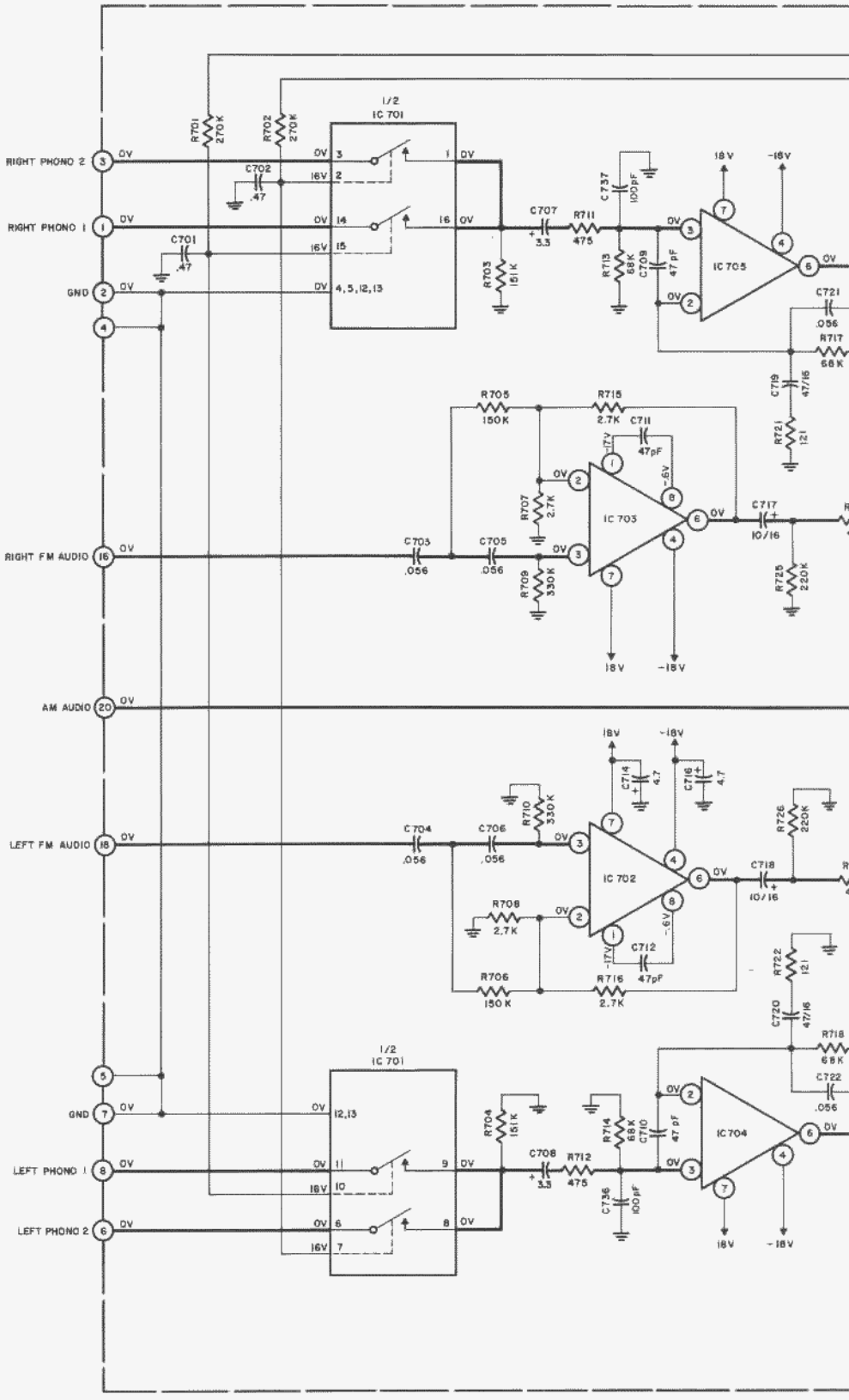


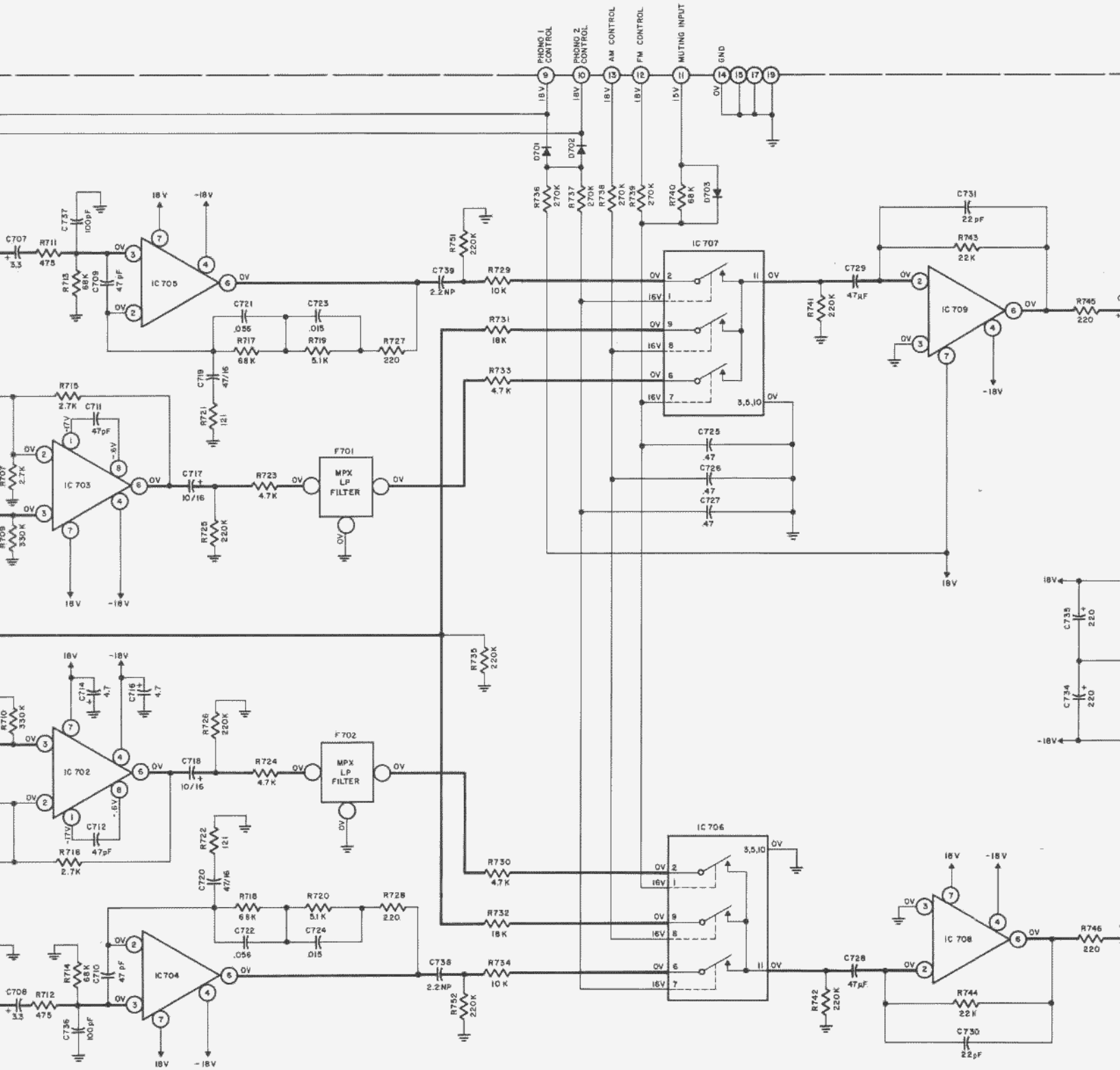

AGC
FM INPUT
GND
AFL
NC
10.7 MHz OUTPUT
10.7 MHz OUTPUT
B+ FOR FRONT E
GND
AM-FM
FRONT END
059-018
AM1
AM2
AM3
LA
TCA
LR1
TCR1
LR2
TCR2
LO
TCO
IF



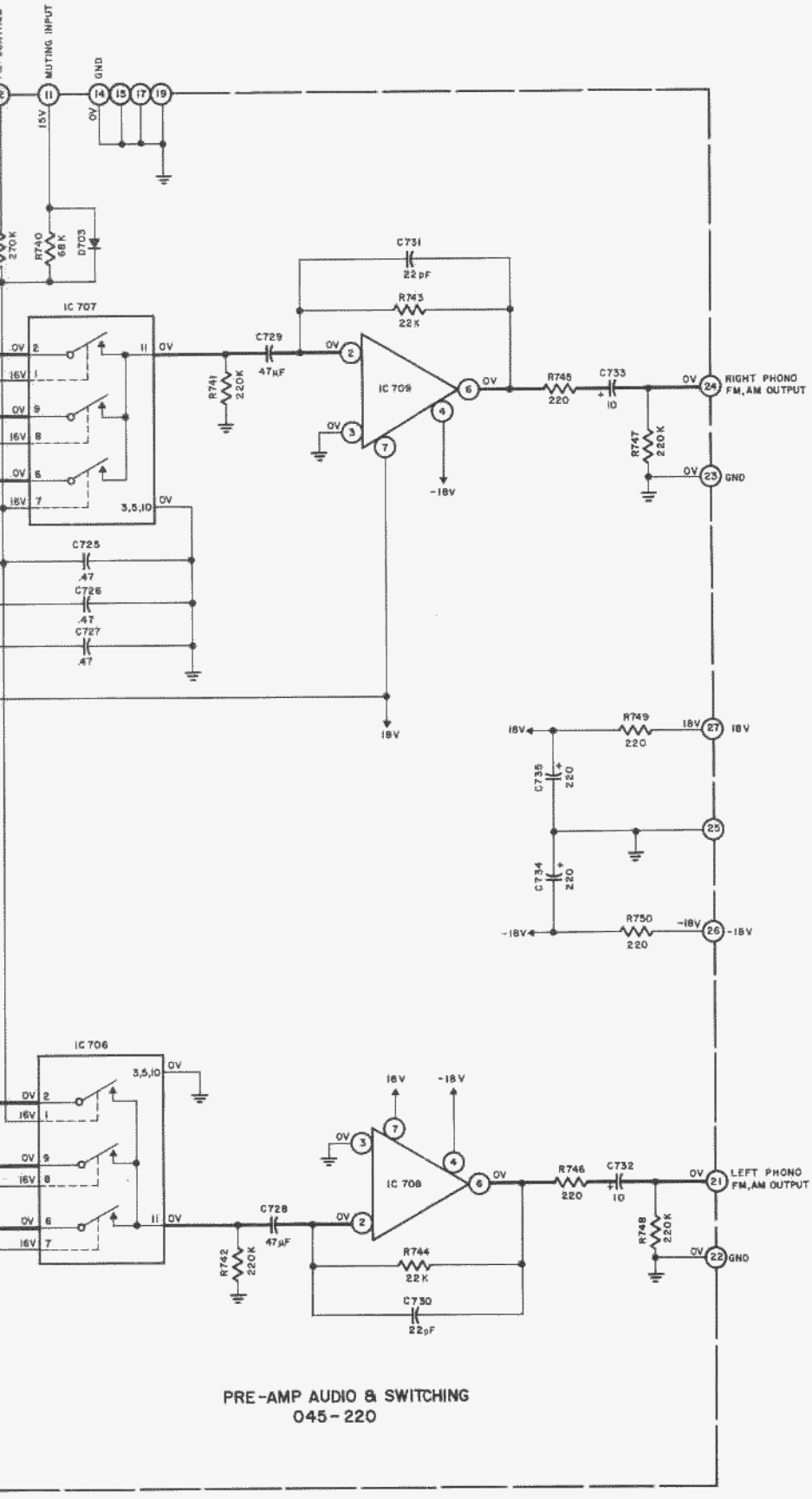
PRE-AMP AUDIO SWITCHING PC BOARD
045220



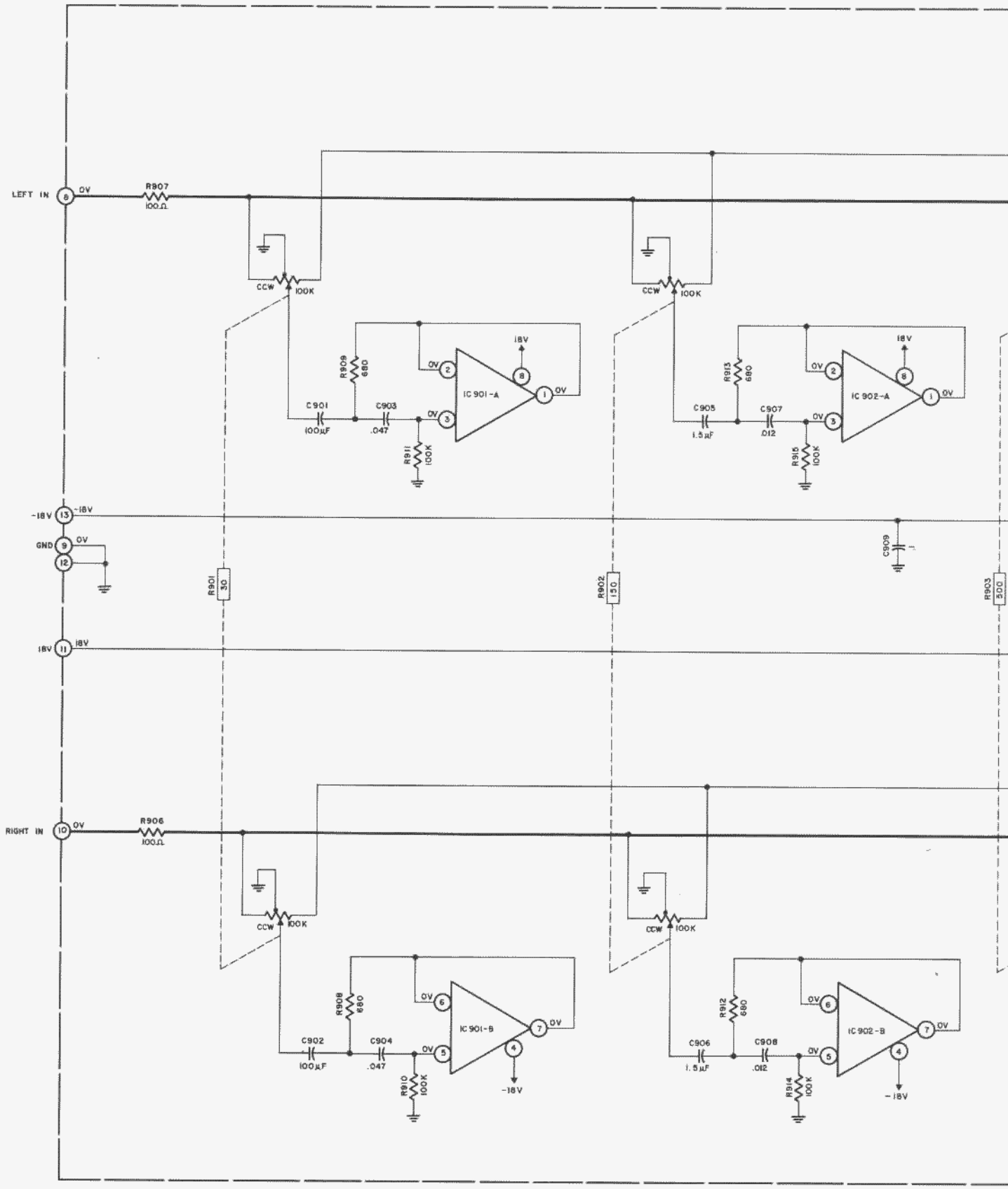

RIGHT PHONO 2
RIGHT PHONO 1
GND
RIGHT FM AUDIO
AM AUDIO
LEFT FM AUDIO
GND
LEFT PHONO 1
LEFT PHONO 2
1/2 IC 701
IC 703
IC 705
IC 702
IC 704
18V
-18V
0V
16V
-6V
-17V
R701 270K
R702 270K
R703 151K
R704 151K
R705 150K
R706 150K
R707 2.7K
R708 2.7K
R709 330K
R710 330K
R711 475
R712 475
R713 68K
R714 68K
R715 2.7K
R716 2.7K
R717 68K
R718 68K
R721 121
R722 121
R725 220K
R726 220K
C701 .47
C702 .47
C705 .056
C706 .056
C707 3.3
C708 3.3
C709 47pF
C710 47pF
C711 47pF
C712 47pF
C717 10/16
C718 10/16
C719 47/16
C720 47/16
C721 .056
C722 .056
C736 100pF
C737 100pF

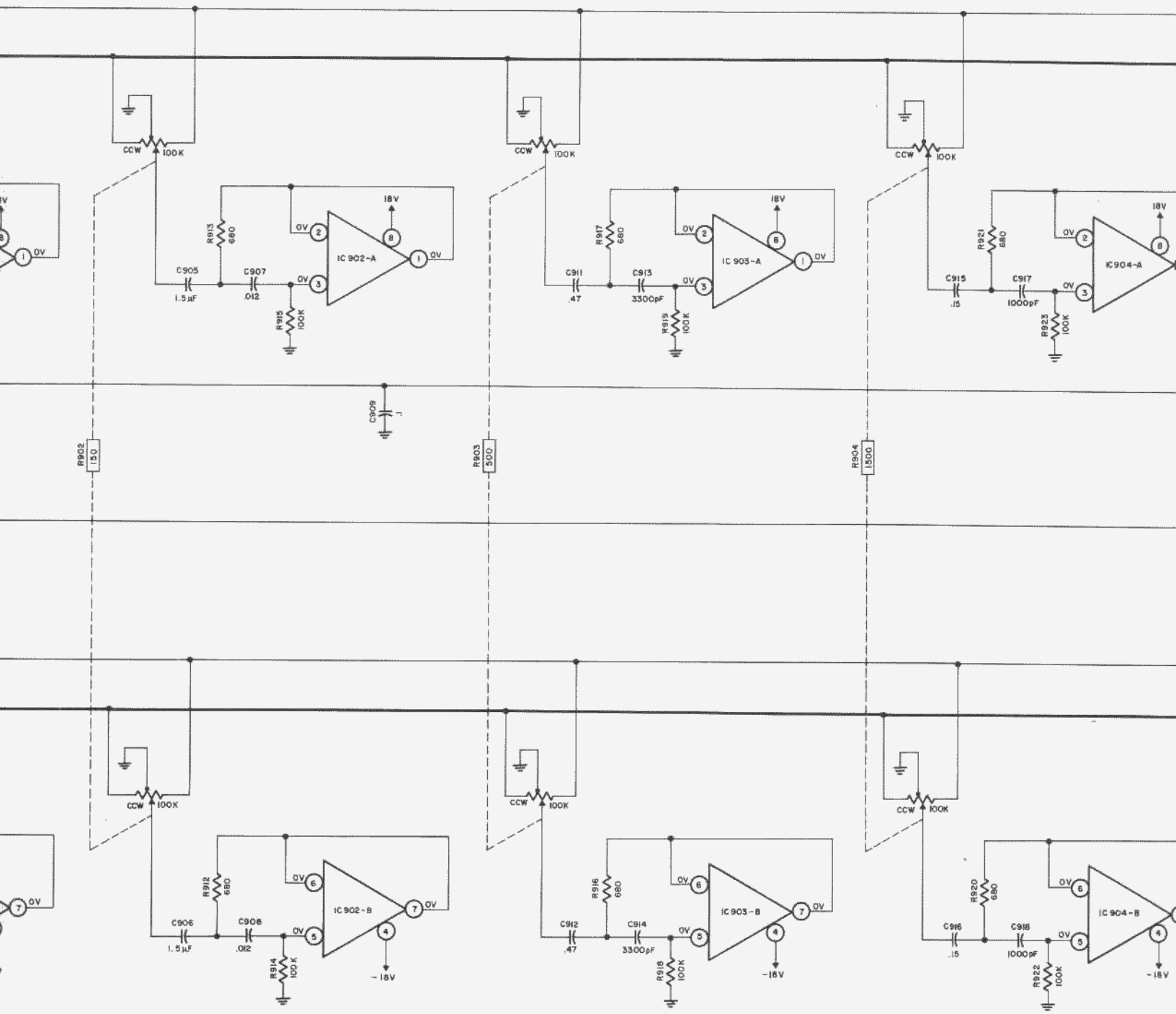


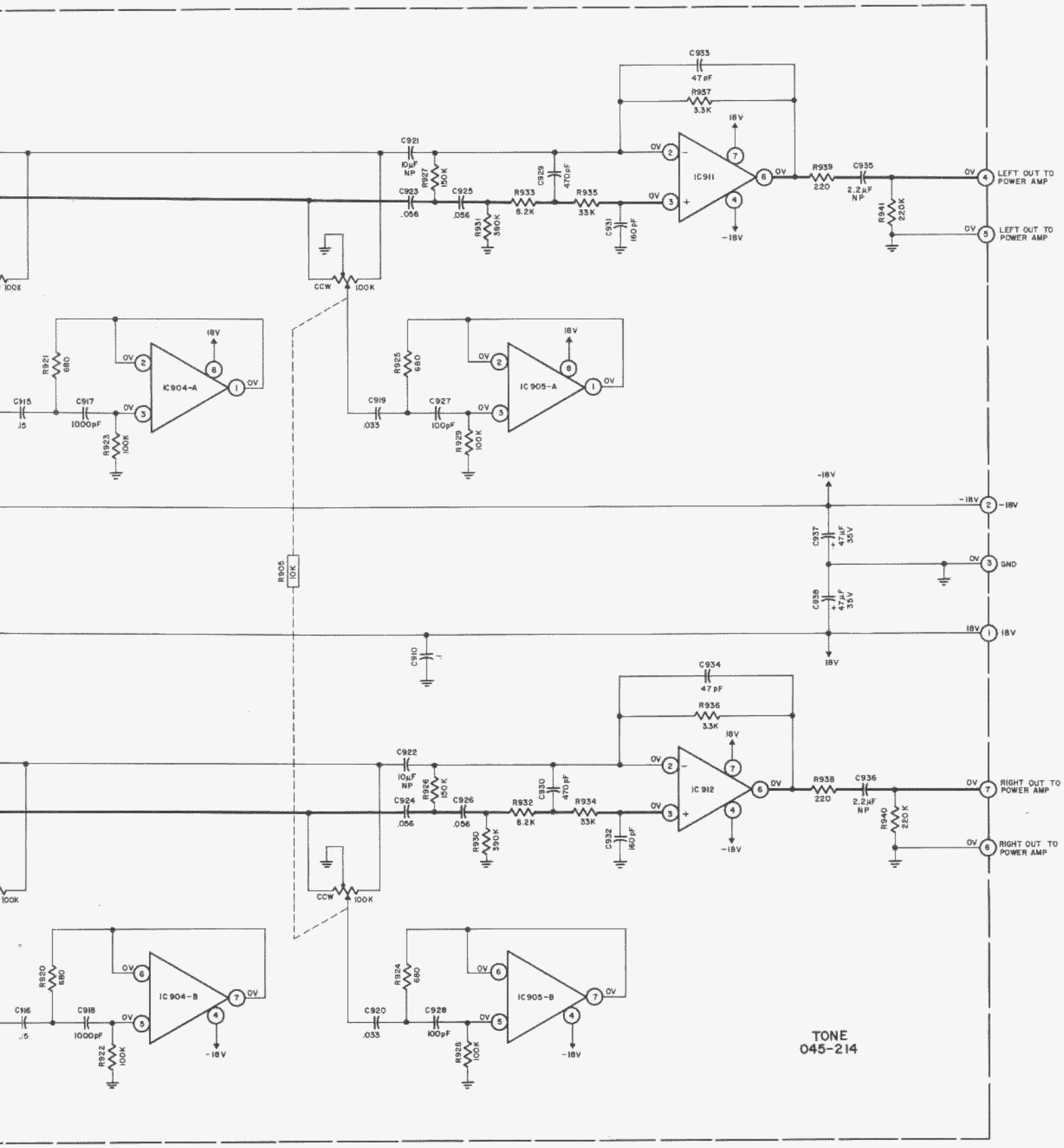
PRE-AMP AUDIO & SWITCHING
045-220

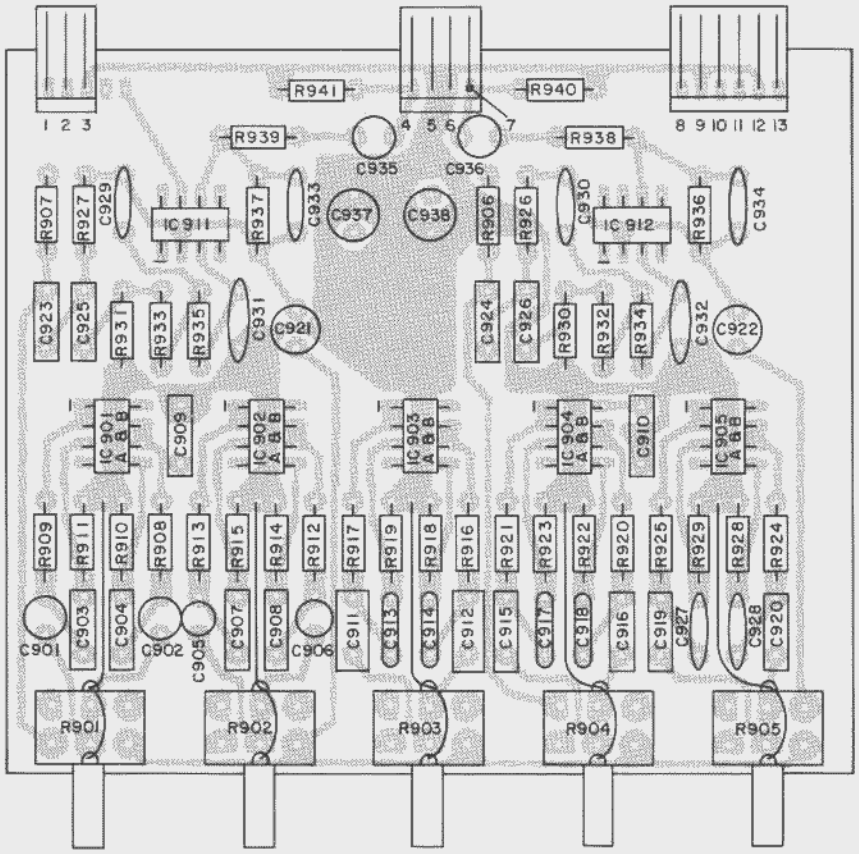


PRE-AMP AUDIO & SWITCHING
045-220

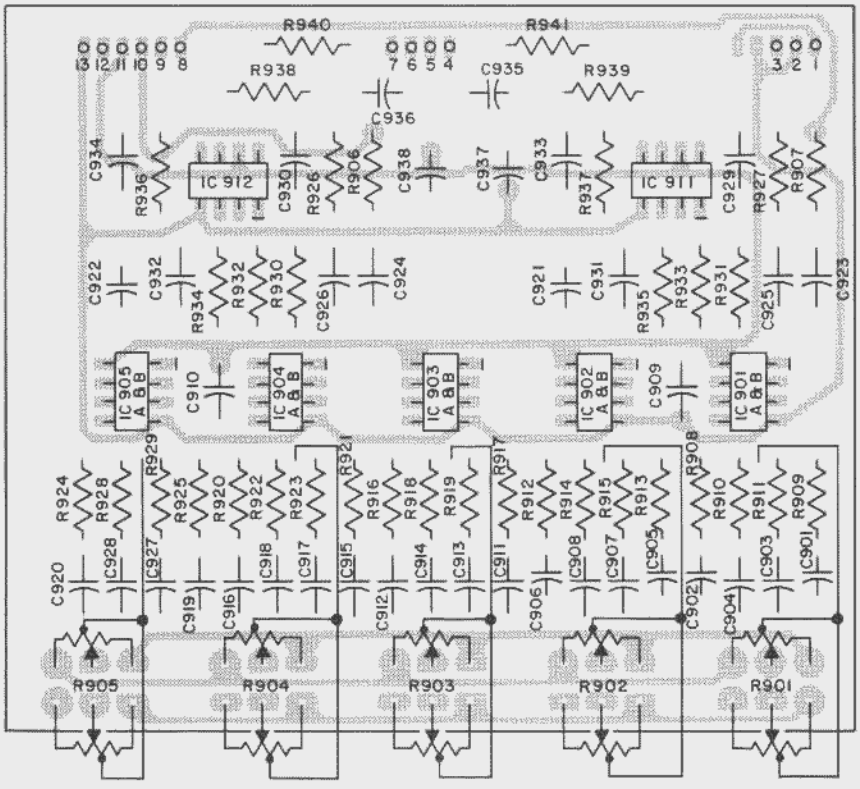

LEFT IN
8
0V
R907
100Ω
CCW
100K
R909
680
C901
100µF
C903
.047
R911
100K
IC 901-A
18V
0V
2
8
1
3
R913
680
C905
1.5µF
C907
.012
R915
100K
IC 902-A
-18V
13
GND
9
12
C909
R901
30
R902
150
R903
300
18V
11
RIGHT IN
10
R906
100Ω
R908
680
C902
100µF
C904
.047
R910
100K
IC 901-B
6
7
4
5
-18V
R912
680
C906
1.5µF
C908
.012
R914
100K
IC 902-B

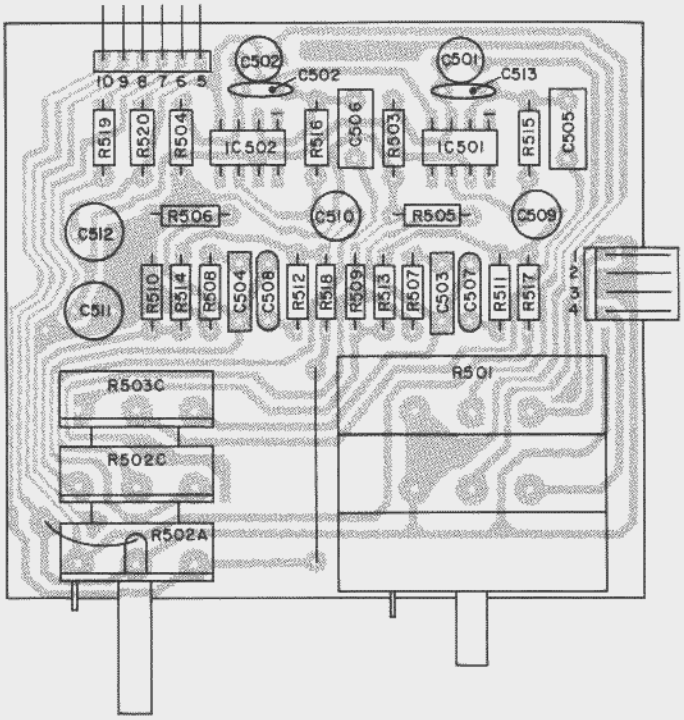

CCW
100K
18V
0V
R913
680
C905
1.5 µF
C907
.012
R915
100K
IC 902-A
C909
.1
R902
150
R903
500
R904
1500
R917
680
C911
.47
C913
3300pF
R919
100K
IC 903-A
R921
680
C915
.15
C917
1000pF
R923
100K
IC 904-A
R912
680
C906
1.5 µF
C908
.012
R914
100K
IC 902-B
-18V
R916
680
C912
.47
C914
3300pF
R918
100K
IC 903-B
R920
680
C916
.15
C918
1000pF
R922
100K
IC 904-B


C933
47 pF
R937
3.3K
18V
C921
10μF NP
R927
150K
C923
.056
C925
.056
R931
390K
R933
8.2K
C929
470pF
R935
33K
C931
160pF
IC911
0V
-18V
R939
220
C935
2.2μF NP
R941
220K
LEFT OUT TO POWER AMP
LEFT OUT TO POWER AMP
100K
CCW
100K
R921
680
C915
.15
C917
1000pF
R923
100K
IC904-A
C919
.033
C927
100pF
R929
100K
R925
680
IC905-A
R905
10K
-18V
C937
47μF 35V
C938
47μF 35V
GND
18V
C910
C934
47 pF
R936
3.3K
C922
10μF NP
R926
150K
C924
.056
C926
.056
R930
390K
R932
8.2K
C930
470pF
R934
33K
C932
160pF
IC 912
R938
220
C936
2.2μF NP
R940
220 K
RIGHT OUT TO POWER AMP
RIGHT OUT TO POWER AMP
100K
CCW
100K
R920
680
C916
.15
C918
1000pF
R922
100K
IC 904-B
R924
680
C920
.033
C928
100pF
R928
100K
IC905-B
TONE
045-214

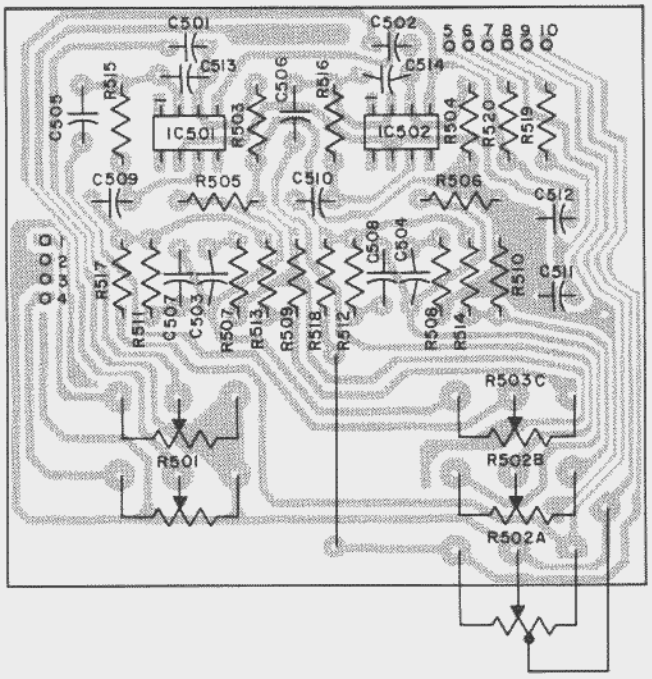


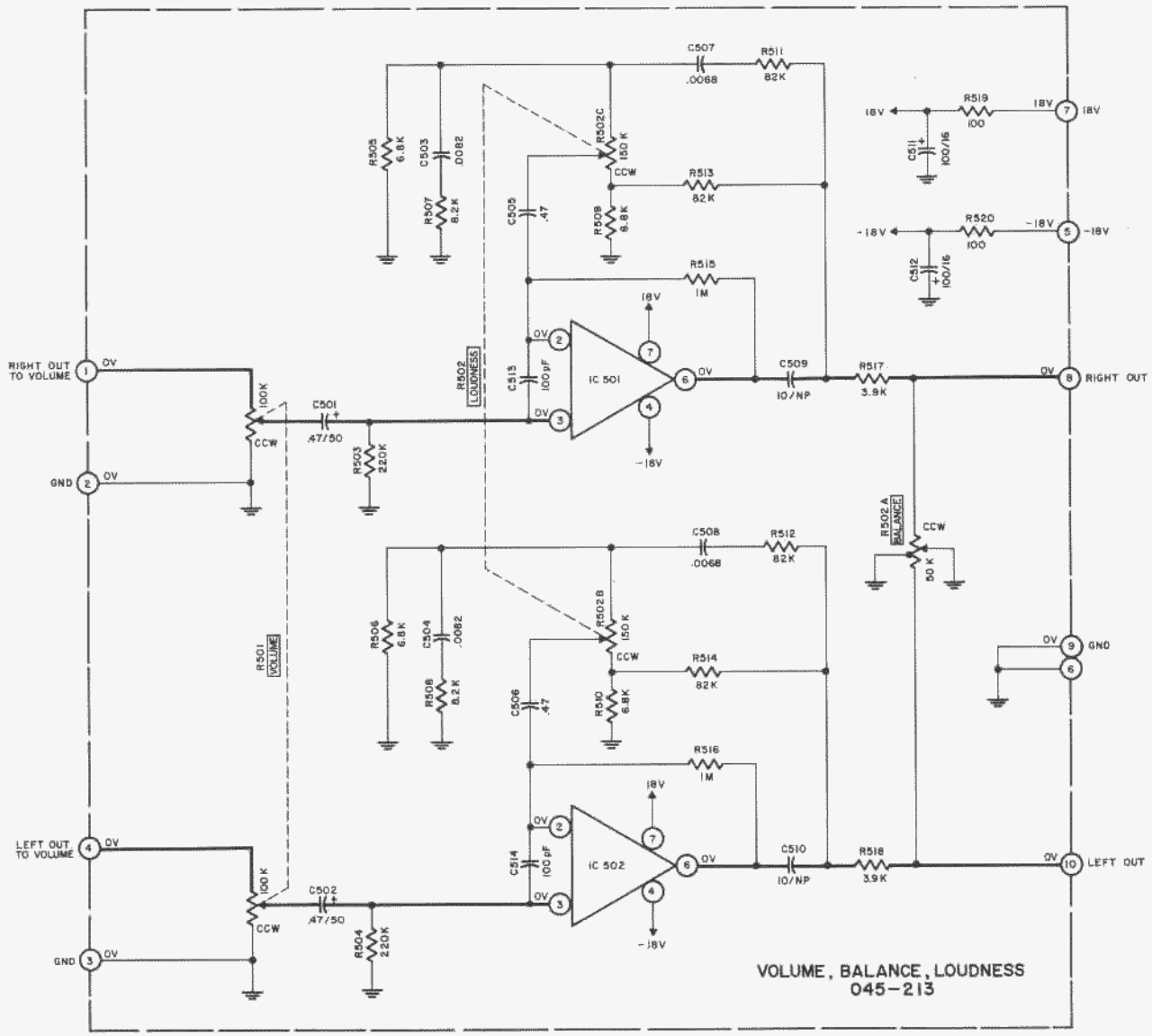
TONE PC BOARD
045214





VOLUME, BALANCE, LOUDNESS PC BOARD
045213




RIGHT OUT TO VOLUME
GND
LEFT OUT TO VOLUME
GND
R501 VOLUME
100K
CCW
C501 .47/50
C502 .47/50
R503 220K
R504 220K
R502 LOUDNESS
R502C 150K
R502B 150K
R502A BALANCE 50K
C503 .0082
C504 .0082
C505 .47
C506 .47
C507 .0068
C508 .0068
C513 100pF
C514 100pF
R505 6.8K
R506 6.8K
R507 8.2K
R508 8.2K
R509 6.8K
R510 6.8K
R511 82K
R512 82K
R513 82K
R514 82K
R515 1M
R516 1M
IC 501
IC 502
18V
-18V
0V
C509 10/NP
C510 10/NP
R517 3.9K
R518 3.9K
C511 100/16
C512 100/16
R519 100
R520 100
RIGHT OUT
LEFT OUT
GND
VOLUME, BALANCE, LOUDNESS
045-213